AN ANALYTICAL STUDY OF VISUAL OUTCOME IN PAEDIATRIC CATARACT SURGERY

Regional Institute of Ophthalmology &
Government Ophthalmic Hospital
Madras Medical College
Chennai

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BRANCH III OPHTHALMOLOGY
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CERTIFICATE

This is to certify that **Dr. Ramya Chelliah, M.S.,** Post Graduate student in Ophthalmology, Regional Institute of Ophthalmology, Govt. Ophthalmic Hospital, attached to **Madras Medical College, Chennai,** carried out this dissertation titled **"AN ANALYTICAL STUDY OF VISUAL OUTCOME IN PAEDIATRIC CATARACT SURGERY"** by herself under my guidance and direct supervision, during the period **July 2003 to September 2006.** This dissertation is submitted to the Tamil Nadu **Dr.M.G.R. Medical University, Chennai** in Partial fulfillment of the award of M.S. Degree in Ophthalmology.

Prof. T.SELVAKUMARI, M.S., D.O.,
Head of the Department
Regional Institute of Ophthalmology
Govt. Ophthalmic Hospital
Egmore, Chennai – 600 008.

Prof. V. VELAYUTHAM, M.S.,D.O.,
Director and Superintendent
Regional Institute of Ophthalmology
Govt. Ophthalmic Hospital
Egmore, Chennai – 600 008.

PROF. DR.KALAVATHY PONNIRAIVAN, B.Sc, M.D

Dean
Madras Medical College &Government General Hospital,
Chennai – 600 003.

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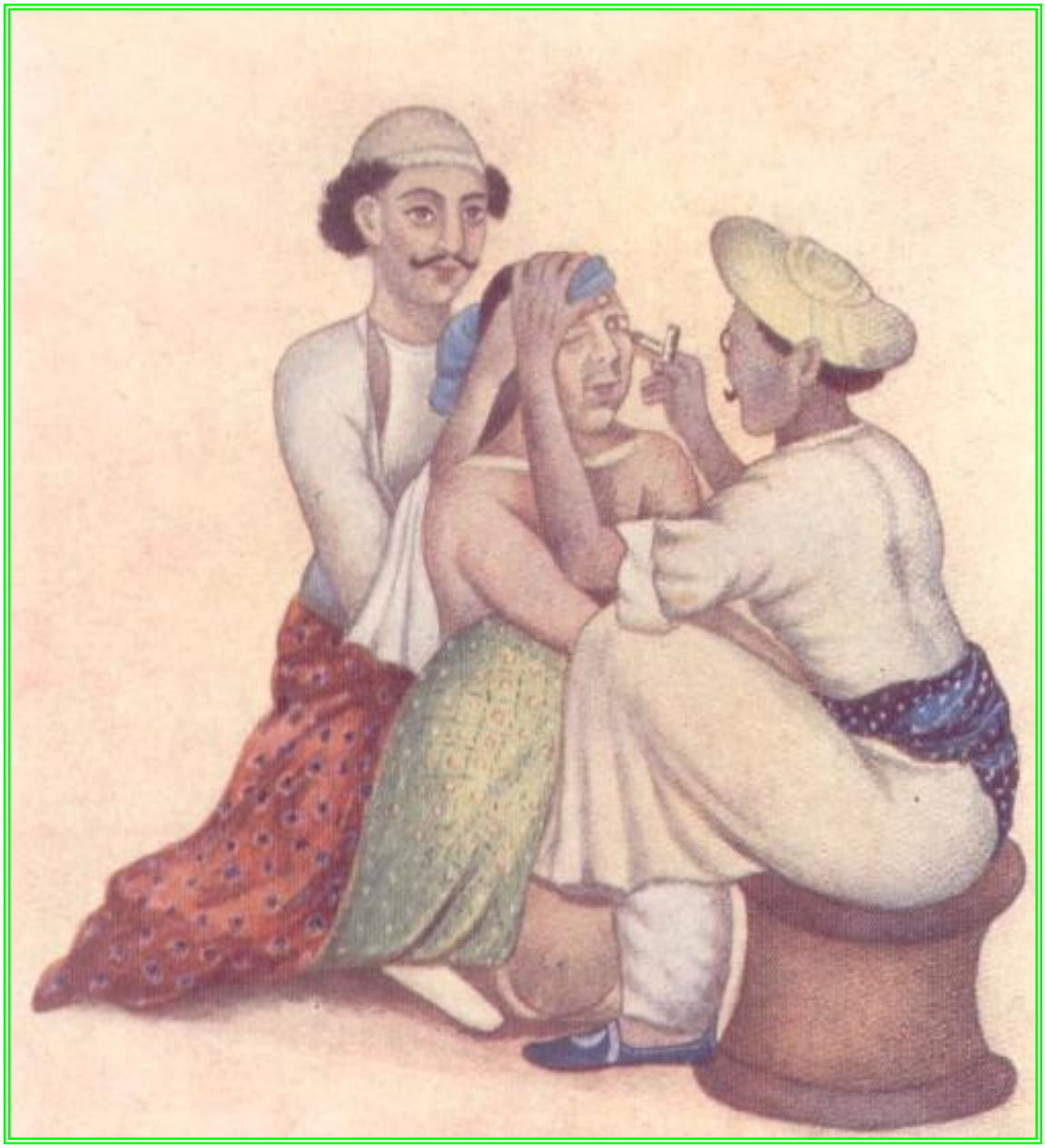
INTRODUCTION

Paediatric blindness presents an enormous problem to developing countries in terms of human morbidity, economic loss, and social burden. One of the common cause of paediatric blindness is paediatric cataract. Managing cataracts in children remains a challenge: presentation is often delayed, diagnosis and assessment requires multitude of investigations, treatment is often difficult, tedious, and requires a dedicated team effort. Post op complications continue to be a major concern. The risk of post op complications is higher due to greater inflammatory response after paediatric intra ocular surgery. To assure the best long term outcome for cataract blind children, appropriate paediatric surgical techniques need to be applied and children have to be monitored and managed by a team comprising paediatric ophthalmologist, orthoptists, optometrists, skilled teachers, social workers and more importantly aware and patient parents.

HISTORICAL OVERVIEW



HISTORICAL OVERVIEW AND EVOLUTION OF PAEDIATRIC CATARACT SURGERY

Surgeons need to study the past so that the lessons learned do not have to be learned again.

1. **OPTICAL IRIDECTOMY**

Developed in 1950's, was useful only in central cataract.

2. **DISCISSION/NEEDLING**

Described by Aurelius Cornelius, a Roman Physician, it was the procedure of choice for over five decades. Thick capsular membrane and secondary glaucoma were the common complications.

3. **ASPIRATION OF CATARACT**

Popularised by Scheie, it was performed as one or two staged procedure. The posterior capsule was left intact. This led to thick posterior capsule and Posterior Capsular Opacification.

4. **IRRIGATION –ASPIRATION TECHNIQUE**

Popular technique by the mid 1960s, double barrelled cannula was introduced, one for aspiration and one for irrigation.

5. **INTRACAPSULAR EXTRACTION**

This was discontinued, due to the higher risk of vitreous loss, caused by forces required to rupture the tough zonules and the use of intra ocular enzymes.

6. AUTOMATED VITRECTOR

This was introduced during the 1970s. The Thick and gummy lens material was easily aspirated with vitrectomy. It is found to be particularly useful for primary posterior capsulotomy with anterior vitrectomy.

7. PHACOEMULSIFICATION

It was used for the first time in the 1970s. This has been found to be a useful extension of the aspiration technique for paediatric cataract.

8. IOL IN CHILDREN AND CURRENT CONCEPTS

- Epstein placed an IOL as early as 1950.
- Binkhorst and co-workers implanted irido capsular fixated IOLs
- Posterior chamber IOLs were popularized by Sinskey /Hiles in 1983- 1993
- Pars plana posterior capsulotomy and vitrectomy - Buckley et al.1993
- Primary posterior capsulorhexis/optic capture-1994 by Gimbel.
- Primary posterior capsulotomy and anterior vitrectomy –1994-2000 by Ben Ezra/Vasavada/Desai.

- Dye enhanced capsular surgery-2000-2002 by Pandey et al.
- Extensive use of New Ophthalmic Viscoelastic Devices like, Sodium hyluronate and Chondroitin sulphate.
- Use of anti-inflammatory drugs in the irrigating fluid. Example, Triamcinolone acetonide and surodex.
- Newer IOL designs like Hydrophobic Acrylic IOLs with square edge design to reduce the chance of PCO.
- Surface modified IOLs such as Heparin Surface Modified lenses.

EPIDEMIOLOGY

As per recent WHO statistics there are 1.4 million children with severe visual impairment or blindness in the world. The burden of disability in terms of blind years is approximately 70 million (1.4 million x 50yrs of age) because of the child's life expectancy after developing the visual disability. The proportion of blindness in children due to cataract is estimated to be 14% or 1,90,000 children.

Of the 70 million blind-person years caused by childhood blindness, about 10 million blind-person years is due to childhood cataract.It is a priority in all blindness control program for children, as loss of vision in children influences their education, employment and social life.

VISION 2020

Vision 2020-right to sight, is an initiative to help eliminate needless blindness by the year 2020, initially launched by the WHO together with non governmental organisation. Break up of childhood blindness from a small sample study.

- Corneal opacity 27%
- Whole globe 24%
- Retina 22%
- Cataract 11%
- Glaucoma 3%

STRATEGIES FOR CONTROLLING SURGICALLY AVOIDABLE CAUSES

To provide specialist training and services for the management of surgicaly remediable visual loss in children from, Congenital Cataract, Congenital Glaucoma, Corneal scar and Retinopathy of Prematurity.

- Strengthen or develop expertise and capabilities within existing eye units to provide surgical services for children with avoidable blindness, including follow up.
- Encourage early diagnosis and referral of children needing eye surgical services.

- Monitor the changing patterns in blinding eye disease in children, so that the appropriate control measures can be implemented.
- Low vision services and rehabilitation

TARGET

Year	Population aged 0-15 years (millions)	Number of blind children	
		Projected (millions)	Target (millions/prevalence)
1995	1800	1.45	1.45 (0.8/1000)
2000	2000	1.60	1.40 (0.7/1000)
2010	2200	1.80	1.20 (0.5/1000)
2020	2500	2.00	1.0 (0.4/1000)

SOCIO ECONOMIC FACTORS RELATED TO CHILDHOOD CATARACT

Childhood blindness is estimated to lead to a loss in earning capacity of Indian Rupees 3 lakhs to 13 crores.By extrapolation, assuming a global growth rate of 3%, the economic loss over 10 years for childhood cataract would be in the order of INR 50000 to 300000 lakhs.

Estimates in India, assuming a blind child has on average 33 years of blindness, and that 14% of childhood blindness is due to cataracts, calculate a lifetime loss of earning capacity of Indian Rupees 1650 crores to childhood cataract. The cost of a cataract intervention in India is of the order of Indian Rupees 5000 to 10000, depending on facilities. The cost of treating the 40,000 blind children from cataract in India would be Indian Rupees 200 to 400 million.

Case finding is of prime importance for the management of cataract in children. Obviously, children with cataract do not present themselves and it takes careful observation by the caregivers or trained health staff to notice lens opacities.

RESTORING SIGHT: AN APPROACH TO CONTROL PAEDIATRIC BLINDNESS

Restoring sight in a child who is blind from cataract depends on four stages:

1. Early detection of blind children within households and communities.
2. Eye examination of blind children and referral of children with cataract.
3. Good quality cataract surgery and optical correction.
4. Follow-up care: regular and long-term.

BARRIERS SPECIFIC TO CHILDREN WITH CATARACT

- Children do not usually complain of symptoms
- Children do not present themselves to health workers
- Visual loss in a very young child is difficult to recognise

People might:

- Wait for the child to 'learn to see'
- Wait for the 'small white spot' to disappear
- Deny the blindness
- Accept the blindness and decide not to seek advice

BARRIERS SPECIFIC TO CHILDREN WITH CATARACT

- Cataract may not be a priority among parents of children with multiple disorders.
- Perceptions and behavior of family and community members
- The perception that blindness is caused by vitamin A deficiency prevents parents from traveling to an eye doctor because 'we know that it is not going to bring any benefit to the child'

FINANCIAL AND PRACTICAL CONSTRAINTS:

- Cost of travel and accommodation for four people (child, mother, male family member, and a neighbour who knows the city).
- Cost of consultation and treatment
- Staying away from work means lost earnings
- The distance to the hospital
- Time to make arrangements and visit the hospital
- Perceived benefits of being blind, such as children can earn money by begging, social service support for blind children, and state benefit for families with a blind child

BARRIERS TO UPTAKE OF CATARACT SURGERY IN CHILDREN AT TERTIARY EYE CENTRES

- Challenges faced by family members
- Many parents are not aware that surgery is the only treatment for childhood cataract
- Parents often prefer medical treatment or non-invasive treatments (including traditional remedies) to surgical treatment
- Experience of poor outcome of cataract surgery in other children from the same locality or family acts as a strong disincentive to the uptake of surgery

FEAR OF:

- surgery in young children
- losing life during surgery
- cutting such a 'small' eye
- 'removing eyes'
- 'removing lens (cataract)' from child's eye
- 'putting lens inside child's eye'
- travelling to the big city to visit the eye hospital

BARRIERS TO FOLLOW-UP OF CHILDREN AFTER CATARACT SURGERY

Barriers Specific to Children

- Children usually do not complain of worsening vision (for example due to post capsular opacification); they need someone to detect the problem during follow-up.
- Children do not present themselves to health workers, they need parents or another adult to decide and act on their behalf.

Perceptions and Behaviour of Family and Community Members

- Often adult patients are told that there is no need to come back after cataract surgery if they continue to see well. This message is generalised to children leading to the belief that there is no need for long term follow-up in children.
- Perception of 'good surgery': 'When the surgery is good, you don't need to go back to the doctor'.
- Perception of 'bad surgery':
- 'They told us to go back to hospital, but if the surgery is not good and the child can't see well, what's the point of going back?'

- Perceived cost of follow-up visit and treatment (on the basis of the cost of initial visit and surgery).

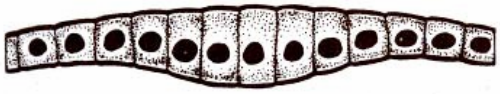
Skills, Attitudes and Practice of Service providers

- Service providers may not be aware of the need for follow-up examinations by an eye doctor
- Lack of clear communication: 'No one told us to go back for follow-up', 'Went for follow-up after two weeks and the doctor said everything is fine'

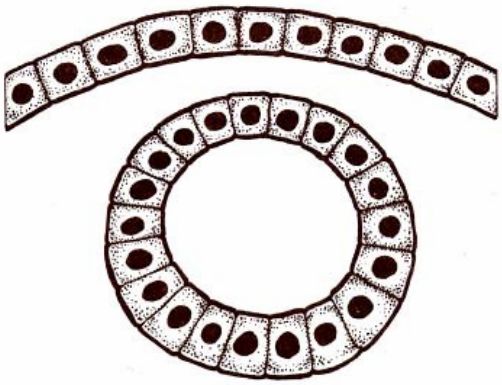
Lack of Services and Linkages

- Lack of referral linkages between local service providers and eye hospitals
- Lack of counselling services for the parents to motivate them to attend for follow-up visits for the child

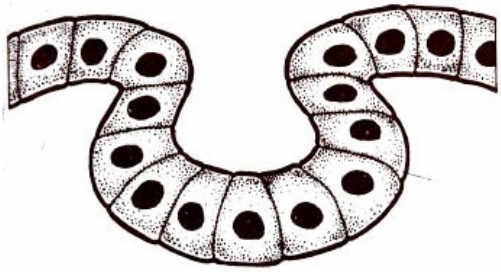
Stages of growth of the embryonic lens



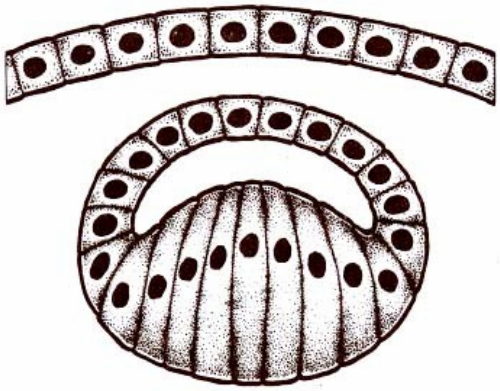
Lens plate



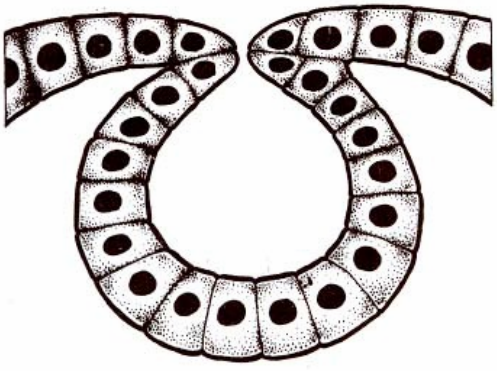
Lens vesicle (early)



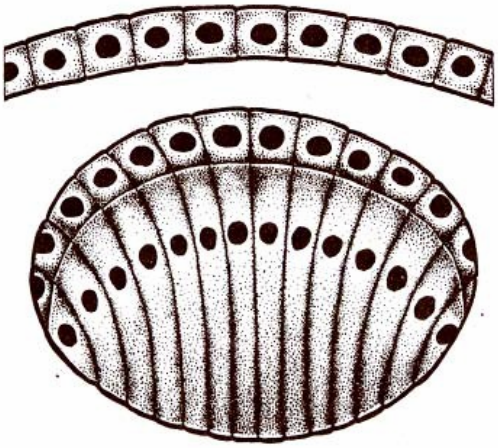
Lens pit (early)



Lens vesicle (late)



Lens pit (late)



Embryonic lens nucleus

LENS ANATOMY AND EMBRYOLOGY

The lens is formed from a layer of surface ectodermal cells overlying the optic vesicle. Beginning about the 28th day of gestation, the ectodermal layer thickens to form the lens plate. This is also known as lens placode. Within days the lens placode invaginates to form a lens cup, which then separates to form the lens vesicle by the end of 5th week. The inner lining of the vesicle consists of a layer of epithelial cells covered by a basal lamina which eventually thickens to become a lens capsule. By week 7, the primary lens fibres that come from the posterior lens epithelium form the embryonic nucleus.

Beginning at weeks 12 to 14, equatorial cells give rise to fibres that meet at the ‘y’ sutures. This forms the fetal nucleus, and the lens material peripheral to this is the cortex. The paediatric lens is soft and pliable unlike the adult nucleus.

Most rapid growth occurs in the first 2yrs of life. The mean diameter of the capsular bag is about 7 to 7.5mm at birth, increasing to about 9 to 9.5mm by the age of 2yrs.

CLASSIFICATION

ETIOLOGICAL CLASSIFICATION

Hereditary

- Autosomal Dominant
- Autosomal recessive
- X-linked
- Sporadic

Intrauterine infections

Prematurity

Metabolic diseases

Associated with other anomalies

Traumatic

MORPHOLOGICAL

Anterior cataracts

- Anterior polar
- Anterior pyramidal
- Anterior subcapsular

Central cataracts

- Nuclear
- Sutural

- Lamellar

Posterior cataracts

- PHPV
- Mittendorf’s dot
- Posterior subcapsular

Diffuse cataracts

- Christmas tree
- Blue dot
- Total
- membranous

Visually significant cataracts

- Total
- Anterior Polar
- Lamellar
- Nuclear

LATERALITY

- Unilateral -These are often due to local dysgenesis and as a rule ,are not associated with a systemic disease and are not inherited. Often associated with a small cornea and microphthalmus.

- Bilateral -These are often inherited, may be associated with a systemic disease.

EVALUATION OF THE CHILD WITH CATARACT

Only a small minority of paediatric cataracts present clinically with subjective complaints relating to vision. Often the first sign is a white or partially white pupil noted by the parents.

- **HISTORY**

  Age at onset of the complaints. Any pre/peri /post natal complications.

- **VISUAL ACUITY**

  In children greater than 5 years, Snellen chart can be used.

  In children less than 5 years Snellen optotype equivalents: both letter identification and picture naming can be tried.

- **PRESENCE OF NYSTAGMUS AND STRABISMUS**

  The direction and amplitude of the nytagmus is noted. The amount of deviation, if present, is assessed by prism bar cover test. It also important to assess if both the eyes take up fixation alternately.

- **ANTERIOR SEGMENT EVALUATION**

  In children less than or equal to 3 years ,it can be done in conventional manner using slit lamp. 6 months-3 years, usually require oral sedation (chloral hydrate, 50- 100mg/kg body weight) or examination can be done under anaesthesia.

- **CORNEAL DIAMETER AND TENSION** ,

  If the child is examined under anaesthesia, then it is advisable to carry out corneal diameter and tension measurement in the same sitting.

  In co-operative children, it can be done with schiotz tonometry, as an office procedure.

- **RETINOSCOPIC REFRACTION**

  It is to be done in all possible cases.

- **FUNDUS**

  When possible, at least the posterior pole is assessed by either direct or indirect ophthalmoscopy.

- **B-SCAN**

  In cases where there is no view of the fundus, due to the media opacity,B-scan can be done to assess the posterior pole.

- **A-SCAN AND KERATOMETRY**

  Should be done when IOL implantation is under consideration. Axial length and keratometry reading is necessary.

- **IOL POWER SELECTION**

The effect of variance in anterior segment anatomy on IOL calculation has been accounted for by newer generations of IOL formulae. Modern theoretic formulae, such as the SRK-T, Holladay I and II, Hoffer Q take these factors into account.

As the pseudophakic eye grows, there is myopic shift in the refraction.Keeping this in mind,the initial postop refractive goal can be chosen.

GUIDELINES IN SELECTING IOL IN CHILDREN

Age in years	Post op refraction
Less than 2	+4D
2-4	+3D
4-6	+2D
6-8	+1D

PROGNOSTIC FACTORS

Cataract surgery in children have a poorer visual prognosis than cataract surgery in adults. It is now recognized, however, that early surgery, accurate optical correction and vigorous treatment of amblyopia can result in excellent vision in many cases.

- Bilateral cataract patients generally do well than unilateral cataract patients.
- Timing of surgery- Congenital cataract obscuring the visual axis will cause irreversible amblyopia unless the retinal images are cleared prior to 6 weeks.
- Presence of preoperative Nystagmus and Strabismus are poor prognostic factors.
- Presence of any associated ocular anomalies, as with mostly unilateral cataracts, like PHPV, Microphthalmos are also poor prognostic factors.
- As paediatric cataracts are different from adult cataracts, they need skilled paediatric surgeons for the best outcome.
- Also depends on the availability of good equipments to perform the surgery.
- Rehabilitation: Paediatric cataract management doesn't stop with good surgery alone. It needs and depends on a good dedicated efforts from the parents ,doctors and the patients themselves. It requires immediate visual rehabilitation with glasses/contact lenses/near vision glasses/prisms.

MANAGEMENT

MEDICAL

Small, partial cataract of less than 3mm or pericentral lens changes can be managed by pupillary dilatation with 2% phenylephrine and part time occlusion. Cyclopentolate or a weaker combination of both cyclopentolate and phenylephrine can be used. Pupillary dilatation is usually reserved for preverbal children.

SURGICAL

Primary IOL implantation has become a preferred approach in children greater than 2years. Implantation of IOL is still questionable in children less than 2years, as these are more susceptible to intense PCO and uveal Inflammation. Microcornea, Microphthalmos and Uveitis are absolute contraindications. Aniridia, Glaucoma and PHPV are relative contraindications.

SURGICAL INDICATION FOR TREATMENT

Patients with dense monocular or bilateral cataracts develop irreversible amblyopia due to visual deprivation if the cataract is not removed by 6-8 weeks of age. Definitive indications are

- Central cataract >3 mm in diameter
- Dense nuclear cataract
- Cataract associated with strabismus and /or nystagmus

SPECIAL CONSIDERATIONS IN PAEDIATRIC CATARACT SURGERY

PRE-OPERATIVE FACTORS

- High incidence of associated ocular and systemic anomalies and prematurity
- Difficulty in calculating IOL

INTRA OPERATIVE FACTORS

- Smaller size of eye
- Poor dilatation of pupil
- Low scleral rigidity
- Need for high viscosity viscoelastic for capsular management
- Highly elastic anterior capsule
- Cortex is stickier and gummier
- Need for primary posterior capsulotomy and anterior vitrectomy

POST OPERATIVE FACTORS

- Higher risk for opacification
- Increased post op inflammation
- Frequent correction of refractive errors
- Poor compliance
- Amblyopia

PAEDIATRIC ANESTHESIA

New directions for the optimal fasting time for children suggest that they may receive clear liquids 2-3hrs before surgery without increasing the risk of aspiration.

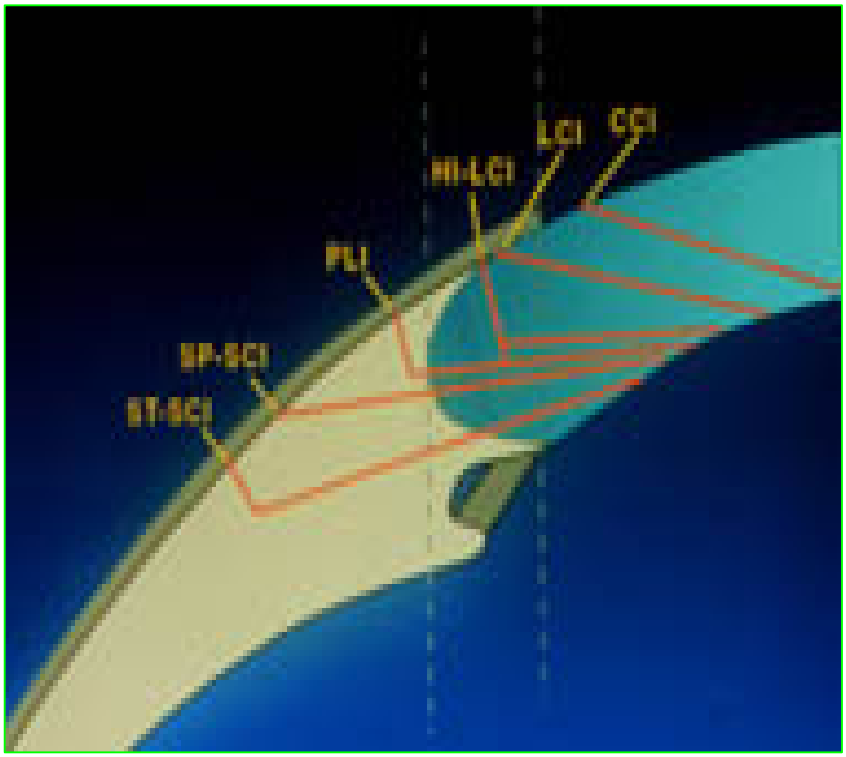
Both inhalational and intravenous general anesthetic techniques have been used. Sevoflurane is a better choice than halothane as it possesses a less offensive odour, is less stimulating to the air way and lacks the arrythmogenic effect of halothane.

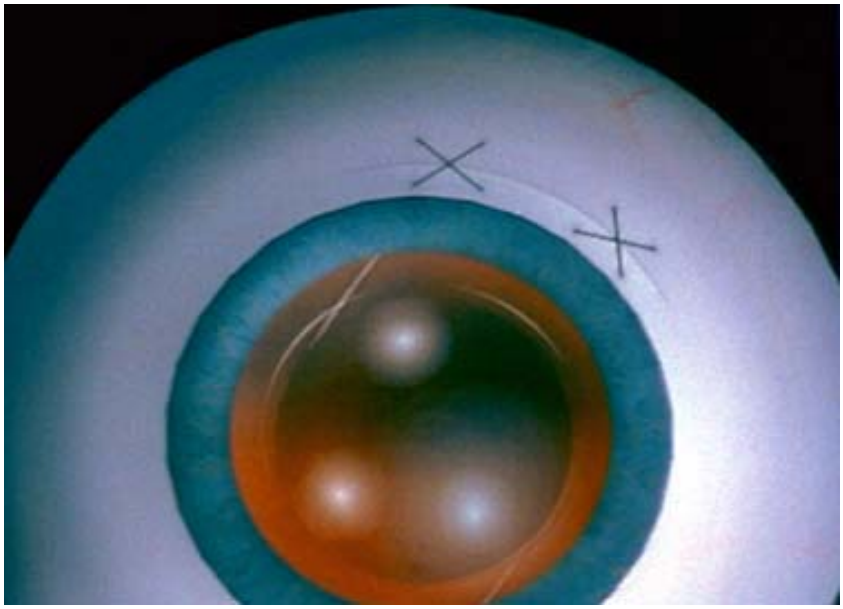
When inhalational agents are not available, intravenous ketamine can be used combined with a peribulbar lignocaine and ocular massage.Children are more prone to manifest a oculo cardiac reflex. Post op pain can usually managed by non-steroidal medications. Post op nausea and vomiting is taken care of by domeperidone or ondansetron.

SURGICAL APPROACHES IN PAEDIATRIC AGE GROUP

- Anterior approach
- Pars plana or pars plicata approach
- Combined anterior and pars plana approach

INCISIONS





TYPES OF SURGERY

- Lensectemy and vitrectomy
- ECCE with IOL
- ECCE with primary posterior capsulotomy with or without anterior vitrectomy and IOL.

SURGICAL TECHNIQUES

INCISION

The superior approach allows the wound to be protected by brow and bell's phenomena in the trauma prone childhood years. Fornix based conjunctival flap is the preffered type of flap. Cauterization is done using wet cautery or bipolar diathermy. Tunnel incisions have replaced limbal incisions. Incision at the steepest meridian would help decrease surgically induced astigmatism. A scleral or corneal tunnel incision is made. Any shape of incision can be made. When inserting a foldable IOL, a corneal incision in older children and scleral incision in infants is preferred. When a pars plana approach is sought for posterior capsulotomy and anterior vitrectomy, a scleral tunnel is preferred even in infants. Anterior chamber entry is made at an angle of 45°with a dimple down maneuver.

OPHTHALMIC VISCOELASTIC DEVICES

- These are cohesive, help to maintain anterior chamber stability and help offset the low scleral rigidity and increased vitreous up thrust found in paediatric eyes.

BIOSTAINING

- Helps to dilate the poorly functioning pupil.
- Indispensable for secondary IOL implantation.
- Reduces the trauma of releasing the extensive posterior synechiae

Examples are, Sodium hyaluronate, Chondroitin sulphate

BIOSTAINING

Four biostains are available to stain the anterior capsule and also the vitreous

- Flourescein sodium
- Trypan blue
- ICG
- Triamcinolone acetonide

Among the four, ICG has been found to be a better option since it enhances the visualisation of the residual lens epithelial cells on the rim of the anterior capsule, which may improve cleaning off these cells, helping prevent or delay PCO.

Since they also enhance visualisation of the anterior vitreous, they potentially improve the outcome of anterior vitrectomy.

Among the four, Triamcinolone acetonide is found to differentiate the vitreous best.

AVAILABLE IOLS

Rigid PMMA,

- Made from MMA monomer.
- Ref index-1.49
- Less uveal biocompatibility
- Heparin surface modified PMMA-to reduce the potential for pigment adhesion on the IOL.

Foldable silicone

- Polymer of siloxane
- Ref index-1.46
- May stimulate anterior capsule fibrosis
- Lowest threshold for laser induced damage

Hydrophilic acrylic

- Mixture of HEMA and acrylic monomer
- Excellent uveal biocompatibility
- Lower capsular biocompatibility leading to more lens equatorial cell out growth ,anterior capsular contracture and PCO.
- High threshold for Nd; YAG laser damage

Hydrophobic acrylic,

- Co polymer of acrylate and methacrylate
- Light weight, relatively inert
- Ref index-1.44 to 1.55 (higher refractive index hence thinner)

- High capsular biocompatibility
- High uveal biocompatibility

MANAGEMENT OF ANTERIOR CAPSULE

High molecular OVD is used to push the anterior capsule back and deepen the anterior chamber, combating the vitreous up thrust caused by scleral collapse. A smaller Continuous Curvilinear Capsulorrhexis is made as, with the stretch in the anterior capsule, the opening is nearly always larger at completion.

CCC can be done by the following techniques, Manual CCC, Vitreorrhexis or Bipolar radio frequency capsulotomy. Out of these, Manual CCC is still the gold standard since it resists tearing, after completion of rhexis.

MULTIQUADRANT HYDRODISSECTION

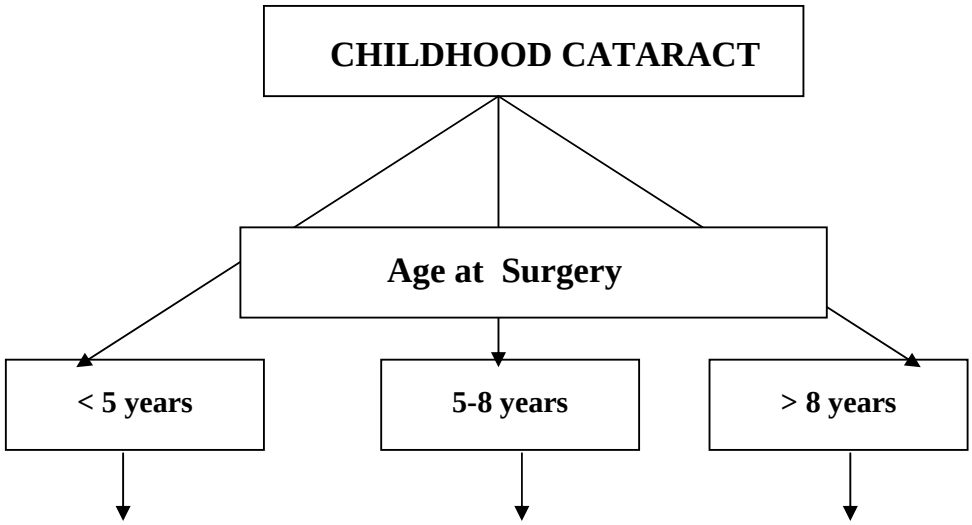
It is done at least in three quadrants. This facilitates easy lens removal, helps in removing equatorial lens epithelial cells, and thereby decreases the incidence of PCO.

LENS SUBSTANCE ASPIRATION

Thorough aspiration is desired either by single port or bimanual approach. Bimanual I/A was developed to make cortical removal easier. Lens substance can be aspirated using the manual or the automated approach. In automated approach,either a phaco machine or a vitrector machine is used.

Even though the tunnels may be intact, it is advisable to suture the wound in paediatric cases.

ROLE OF POSTERIOR CAPSULOTOMY AND ANTERIOR VITRECTOMY



Posterior Capsulotomy with anterior Vitrectomy	Posterior Capsulotomy with or without Vitrectomy	Intact Posterior Capsule.

Generally speaking PC is left intact for children 8years or older. Anterior vitrectomy is an essential step, in patients upto 5years of age since vitreous face opacification is likely to occur if an anterior vitrectomy is not performed. In children between 5-8years, it is an optional step since the chances are better that a Posterior CCC alone will result in a long term clear axis.

IOL is placed either before or after performing posterior capsulotomy and anterior vitrectomy. Ideally, one should aim to achieve an optimum size (1to 1.5mm smaller than optic), centric, circular opening. Sufficient vitreous should be removed centrally so that the lens epithelial cells cannot use the vitreous face as scaffolding to visual axis opacification.

POST OP MEDICATIONS

At the end of surgery some surgeons prefer to give Subconjunctival antibiotics and steroids.

Drugs as eye drops	**Dosage**	**Duration (Weeks)**
1% Prednisolone acetate	every1-6 hrs	4-12
NSAIDS Ketorolac/Flurbiprofen/Diclofenac sodium	3-4 times per day	4-6
Cycloplegics Cyclopentolate/homatropine/atropine	1-2times per day	2

Steroids, like 1% prednisolone acetate for every 1 to 6 hrs for 4 to 12 weeks are prescribed. Systemic steroids are given when needed in dosages of 1 to 2 mg per day PO for a week and then tapered off. Topical NSAIDS, are

given 3 to 4 times per day for 4 to 6 weeks. Flurbiprofen or Ketorolac can be used. Cycloplegics like Cyclopentolate or Homatropine or Atropine are used.

Surodex, is a drug delivery system with 60 microgram of Dexamethasone incorporated into a polymer matrix (poly lactic-glycolic acid), with sustained and controlled release of Dexamethasone over seven days. This pellet is inserted into the anterior chamber at the end of surgery.

REHABILITATION

Optical Rehabilitation

- IOLs

  The use of IOL in children remains controversial. An infant eye undergoes dramatic changes including axial length elongation during the first year of life and also these eyes are most susceptible to intense PCO. Currently primary IOL implantation is preferred in children greater than 2years of age.

  Secondary IOL insertion

  Secondary IOL implantation after primary posterior capsulotomy and anterior vitrectomy. IOL is placed in the ciliary sulcus, Heparin Surface Modified PMMA IOL are preferable in such situations. When there is not enough capsular support ,Scleral fixation IOL or Iris claw or clip lens or anterior chamber IOL can be tried.

- Spectacle correction

  Children aged less than 10 years with bilateral aphakia generally adapt very readily to the magnification and distortion produced by high plus lenses. Bifocals for near addition is to be introduced between 18 months to 2 years .

- Contact lenses

  There are three major contact lens types

  Silicon Elastomer

  Rigid Gas Permeable

  Hydrogel

  The aphakic contact lenses are relatively thick and are easily lost or rubbed off. Silicon elastomers are found to have a lower lens loss rate.

- Near Vision Correction
- Prisms
- Low Vision Aids

Social Rehabilitation

Counselling parents, teachers and patients.

YAG capsulotomy / surgical capsulotomy

Nd: YAG laser capsulotomy is indicated for treatment of opacification of posterior capsule resulting in decreased visual acuity.

Corneal scars or edema is an absolute contra indication, where as, active inflammation is a relative contra indication for performing capsulotomy.

Assessment of significance of capsular opacity is done by visual acuity examination, fundus visualisation, retinoscopy, red reflex. Pupil is well dilated before the procedure. Using a minimum energy of 1mJ, cruciate opening is made in the centre. Post capsulotomy, the patients are put under topical steroid, cycloplegics and beta blockers.

FOLLOW UP

The patients are idealy reviewed daily for first 3 days, weekly for a month, monthly for 3 months, every 3 months for 1year and every 6 months there after. During review visual acuity is examined with Snellen chart or equivalents. Anterior segment is examined with slitlamp. Fundus examination is carried out with direct ophthalmoscope or indirect ophthalmoscope. Intraocular tension is measured when indicated. Retinoscopic refraction is done. Child under amblyopia therapy should undergo orthoptic evaluation and tests for fusion. Common post op complications like uveitis and PCO are looked for and treated accordingly.

POST OP COMPLICATIONS

EARLY ONSET

- Anterior uveitis

It is a common complication owing to increased tissue reactivity in children, resulting in fibrinous membrane formation, pigment deposits on IOL and posterior synechiae formation.

HSM PMMA has shown to reduce this. A complete resolution of this fibrin formation was seen with recombinant tissue plasminogen activator, but it can cause hyphaema and corneal endothelial damage due to increased tissue reaction in children.

- Corneal edema
- Endophthalmitis
- Non-infectious inflammation

LATE ONSET

- Posterior Capsular Opacification

This is the most common complication. In infancy the rate of occurrence is nearly 100% unless a generous posterior capsulotomy and anterior vitrectomy is performed. Older children show progressively less tendency to reopacify, but the rate remains considerably higher than for adults.

This is of significance due to its potential to cause amblyopia. The incidence of PCO depends on, the age at surgery, type of cataract whether congenital or developmental or traumatic, aphakia versus pseudophakia, ciliary sulcus versus capsular bag fixation and associated abnormalities(persistent fetal vasculature, Microcornea).

Recent modifications in IOL design(square edge) and improved biocompatibility has significantly reduced the incidence. and also primary posterior capsulotomy with or without anterior vitrectomy has decreased the chance for PCO. PCO is managed by either YAG laser or surgical capsulotomy.

- Secondary membrane formation

It is a closure across a previously open space such as the pupillary membrane after anterior or posterior capsulotomy

- Pupillary capture

Often occurs in association with PS and PCO. Placing the IOL in the bag with an anterior capsulotomy smaller than the optic helps prevent this.

- Deposits on the IOL

Precipitates composed of pigments, inflammatory cells, fibrin, blood break down products on the surface of IOL occurs less with, in the bag IOL and Hydrophilic acrylic lens.

- Decentering of IOL

- Strabismus

It is common when deprivation amblyopia is present. Its incidence is more common with unilateral cataract ,early onset cataract. More common in aphakia than in pseudophakia as the latter has the advantage of constant optical correction. It can occur also if the proper optical correction is not worn or if occlusion therapy leaves little time for binocular viewing.

- Amblyopia

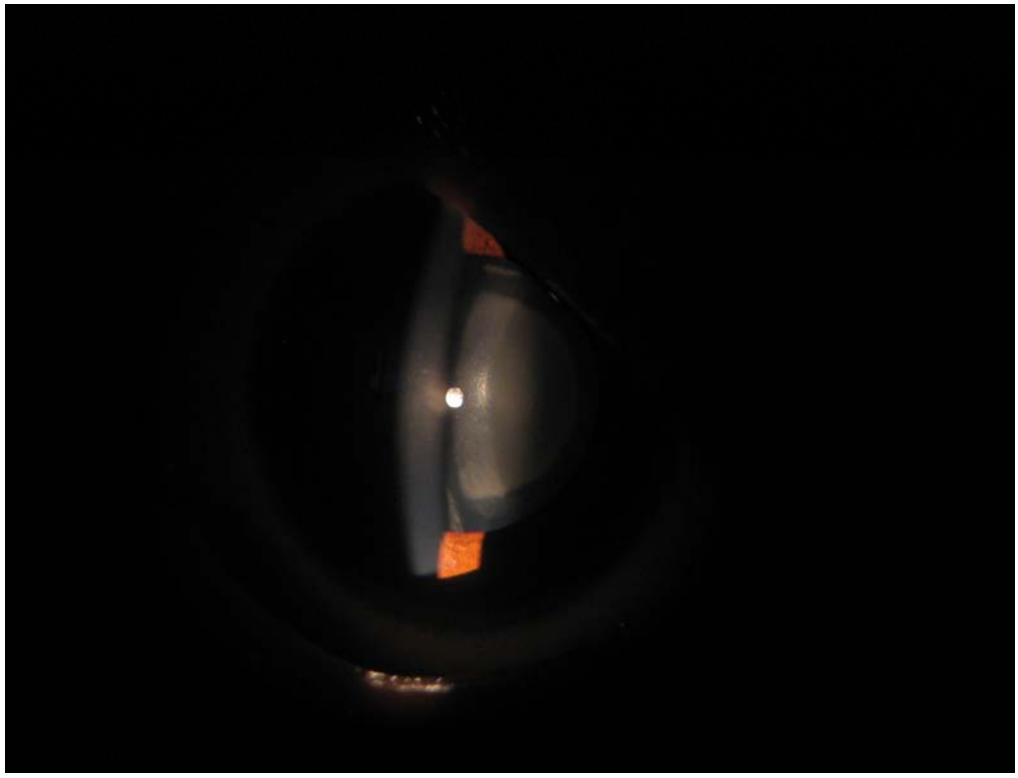
The appropriate spectacle correction should be prescribed after refraction. Full time patching is recommended in the eye with better vision for 1week per year of age. This is followed by repeated eye examination. Non-compliance with occlusion therapy appears to be a major barrier in achieving a satisfactory visual outcome during the treament of amblyopia.

- Delayed opacification of foldable IOL
- Deposits of calcium and phosphate
- Post op glaucoma
- Retinal Detachment
- Cystoid Macular Edema
- Hemorrhagic retinopathy

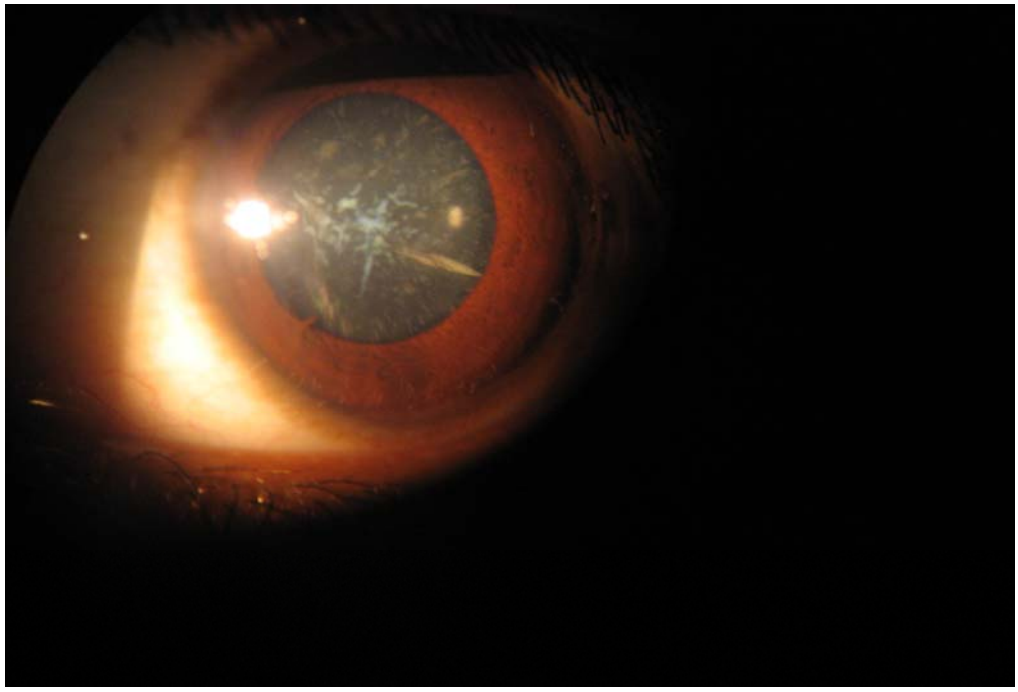
HORIZONS AND VISTAS

Paediatric cataract surgeons now stand at the threshold of a new era, filled with the kind of promise and excitement that greeted adult cataract surgeons nearly two decades back as they entered the age of modern cataract surgery and IOL implantation.There are number of specific areas in which future will hopefully bring solutions to current problems or concerns.

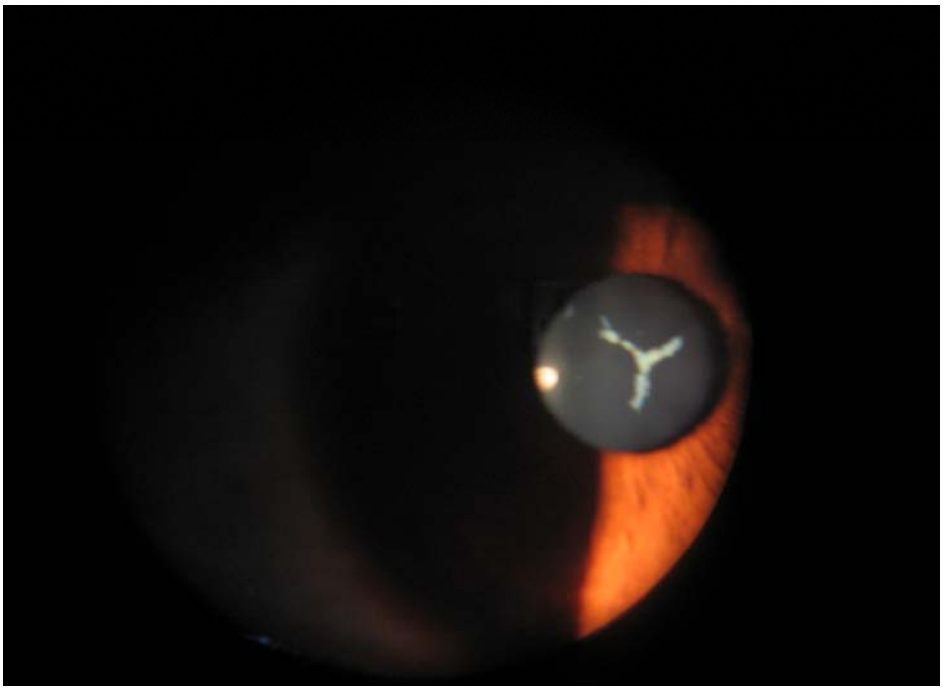
Longer observation also will provide much needed further information concerning the refractive maturation of pseudophakic eyes . Technical advances specifically developed for paediatric IOL surgery are much awaited, particularly with reference to wound construction and capsule management. Secondary IOL surgery, particularly in eyes with little or no residual capsule, represents an important challenge for future surgeons.



No.46 Parveen 6/F. Lamellar Cataract

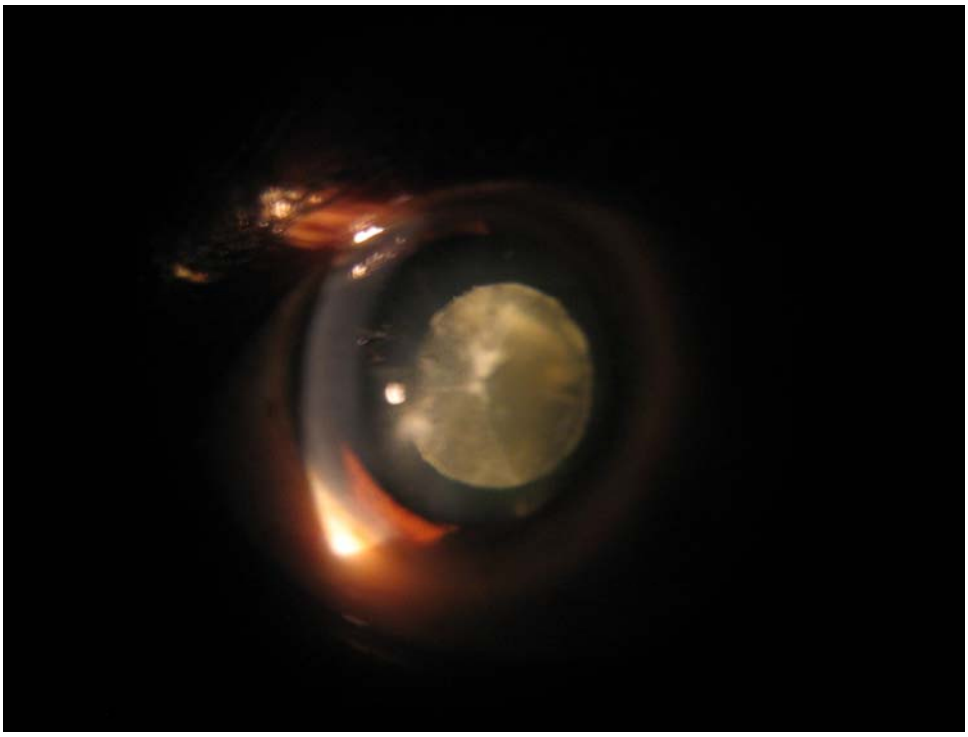


No. 9 Selvaraj 12/M Blue Dot Cataract



No.45. Logini 3/F. Sutural Cataract

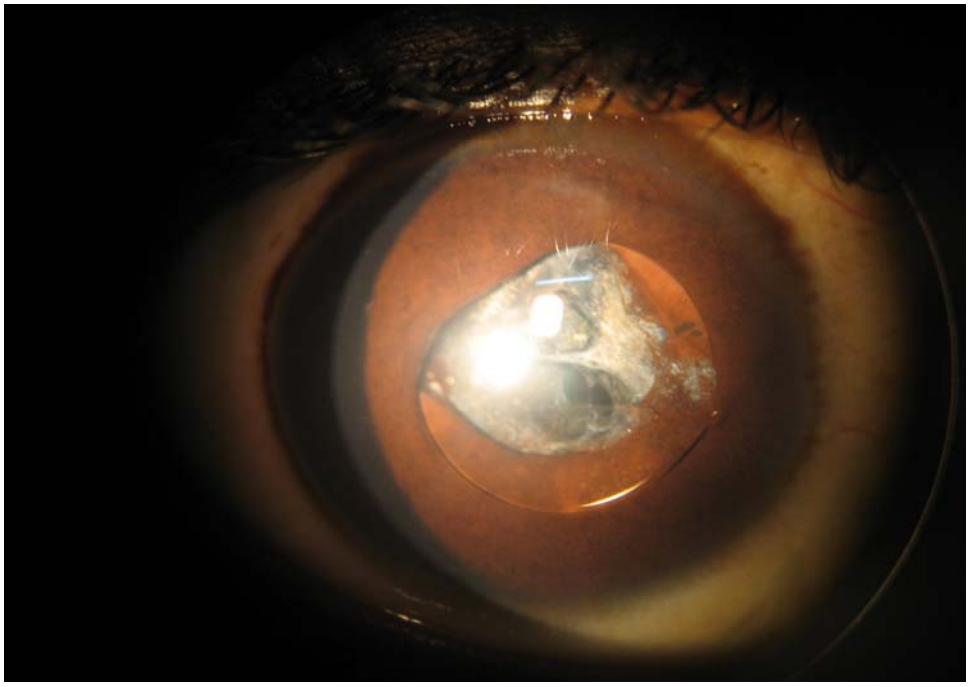
No.18 Poovarasan 10/M Floriforn Cataract



No. 13 Marudhupandi 12/M. Lamellar Cataract

No.16. Ibrahim 9/M Strabismus Associated with cataract

No.34 Kanishgar 4/M PCO



No. 17 Pavithra 10/F. Pupillary Capture

PART – II

AIM OF THE STUDY

- To study the Morphological Pattern and Presentation of patients with Congenital and Developmental Cataract.
- To study the Ocular Morbidity and Visual out come after Cataract Surgery in Paediatric age group.
- To study the Post Op Complications and Capsule behaviour pattern in Paediatric Cataract.
- To study the Visual outcome after YAG LASER and Surgical Capsulotomy.

MATERIALS AND METHODS

50 children who presented with developmental cataract in the age group of 2- 12years to the Regional Institute of Ophthalmology and Government Ophthalmic Hospital during the period February 2004 to February 2006 were included in this study.

INCLUSION CRITERIA

1. Children with congenital and developmental cataract in the age group 2 to 12 years.

EXCLUSION CRITERIA

- Children with traumatic Cataract
- Children with complicated Cataract
- Children aged less than 2 years and more than 12 years and
- Mentally retarded children.

All children received a complete ophthalmic evaluation. Visual acuity in children less than 5 years was assessed using picture chart and Teller acuity cards.

Anterior segment evaluation of cornea, iris, anterior chamber and lens was carried out using slit lamp biomicroscopy. Fundus examination was done using direct or indirect ophthalmoscopy.

In children less than 5 years, examination was done under sedation or general anaesthesia. Examination Under Anaesthesia included Corneal Diameter measurement, Intraocular tension and Fundus examination.

Cases that had poor fundus view and all unilateral cases were subjected to B-scan ultrasonography. Serological screening for congenital infections was done in selected cases.

Presence of Nystagmus and ocular deviation was noted. Children with strabismus, underwent detailed orthoptic evaluation including prism bar cover test, tests for the presence of BSV and stereopsis was tested in cooperative children. It was noted if the child could alternate fixation between the two eyes. cycloplegic refraction was done in possible cases. Any associated anomalies were also noted.

As the study involved children greater than 2 years of age, IOL was planned in all children except for four children who had microphthalmos. A-scan axial length measurement and K reading was done for IOL power calculation. ECCE with primary IOL implantation with primary posterior capsulotomy, with or without anterior vitrectomy was planned for children aged less than 6 years and ECCE with primary IOL alone was planned for children aged greater than 6 years.

After obtaining an informed consent from the parent or the guardian, for the surgery and placement of IOL children were operated under inhalational general anaesthesia.

SURGICAL TECHNIQUE

Fornix based conjunctival flap was raised. Wet field cautery was done to cauterize the bleeding vessels. Scleral tunnel was performed superiorly. After entering the anterior chamber with the Keratome, the chamber was filled with visco elastic. Manual CCC was performed. Thorough cortical aspiration was done manually with Irrigation/Aspiration cannula. Posterior CCC smaller in size than the optic diameter was done, followed with or without anterior vitrectomy. Posterior capsule was left intact in children above 6years. PMMA IOL was placed in the bag.. The surgical wound was sutured in all cases.

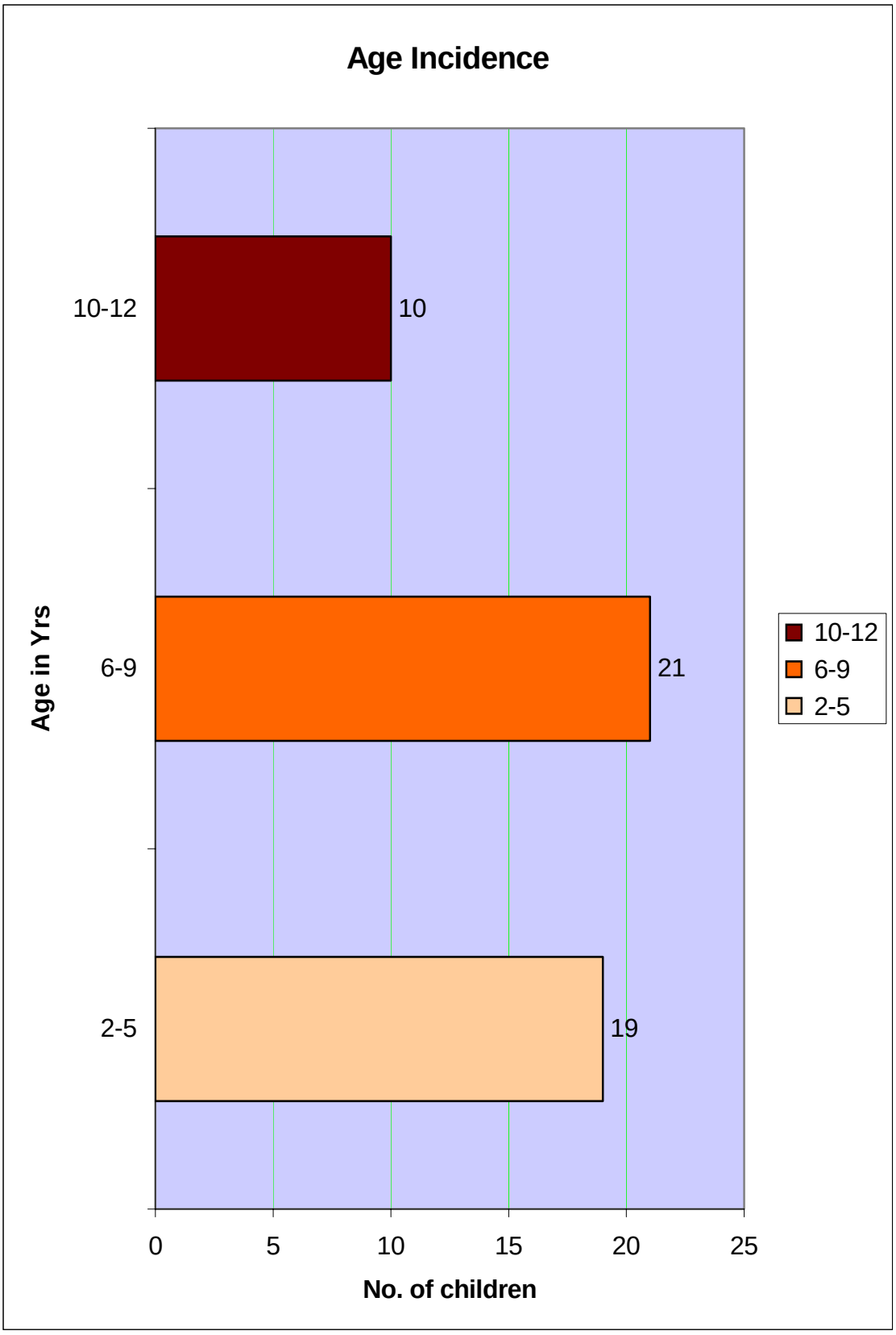
POST OPERATIVE CARE

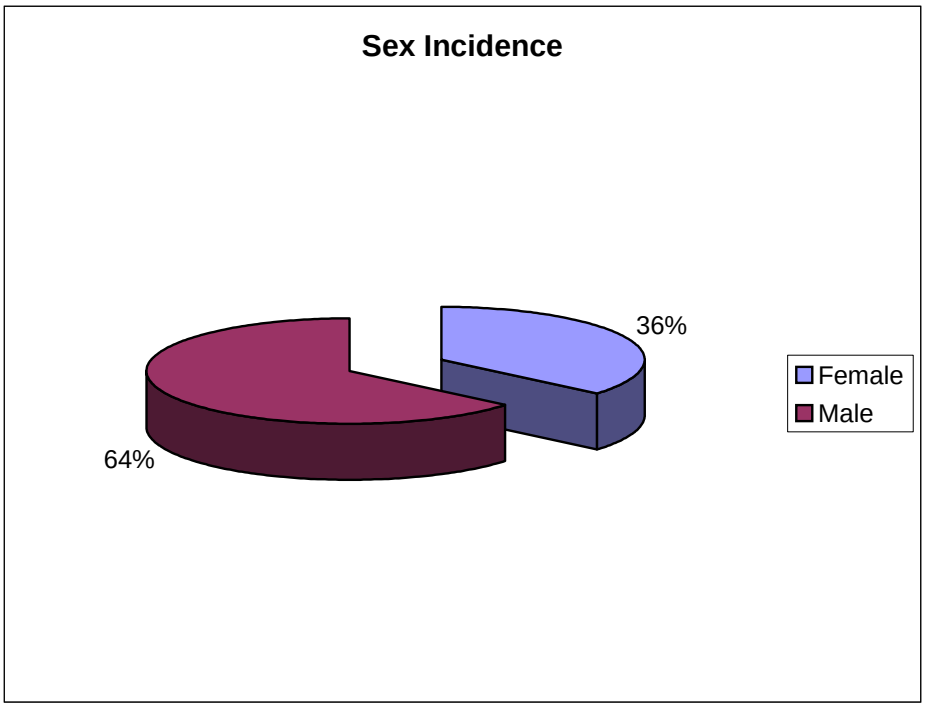
All children received topical steroids every 4 hours and Cycloplegics twice a day. Topical steroids were continued and tapered of in 4-12 weeks and cycloplegics were discontinued after 2 weeks.

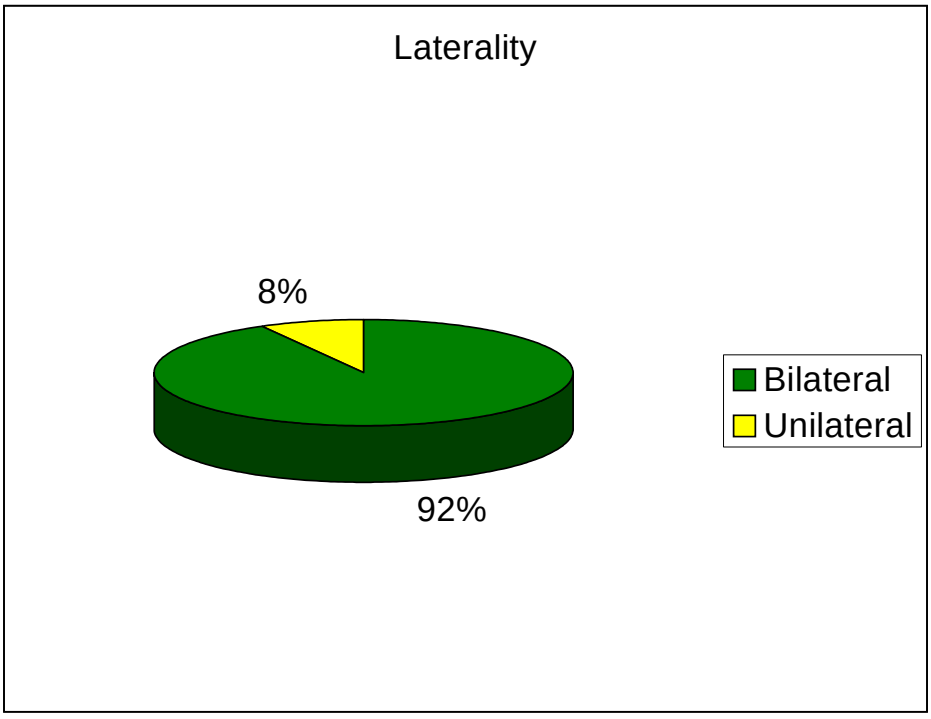
Children were reviewed every day for first 3 days and then every week for first month and every 3 months for the first year. Visual acuity for near and distance, with and without correction was recorded during each visit.

Anterior segment examination was done with Slit lamp and Fundus was examined with direct or indirect ophthalmoscope under full dilatation. Retinoscopic refraction was done and refractive errors were corrected Children were prescribed bifocal spectacles. Three aphakic children received aphakic spectacles and one aphakic child received contact lens.

PCO which caused visual obscuration were detected and taken up for either YAG laser or surgical capsulotomy. The eyes were well dilated before the procedure. Using a minimum energy of 1 to 2 mJ a sufficient opening was made in the centre of the posterior capsule. 1% prednisolone acetate eye drops, 2% homatropine eye drops, 0.25% timolol maleate eye drops were prescribed for a week after the procedure. The seven unilateral divergent squint cases received occlusion therapy as a part of amblyopia treatment.


Age Incidence
10-12
10
6-9
21
2-5
19
Age in Yrs
0
5
10
15
20
25
No. of children
10-12
6-9
2-5


Sex Incidence
36%
64%
Female
Male


Laterality
8%
92%
Bilateral
Unilateral

ANALYSIS AND DISCUSSION

AGE INCIDENCE

Majority of the patients were between 2-9 years (40%, 6-9 years and 38% in 2-5 years). 22% of children were in 10-12 years of age.

Age in (yrs)	Female (no)	Percentage	Male (no)	Percentage	Total (no)	percentage
2-5	6	12	13	26	19	38
6-9	7	14	14	28	21	42
10-12	5	10	5	10	10	20
Total	18	36	32	64	50	100

SEX INCIDENCE

In this study boys outnumbered girls, 32 (64%) were males, 18 (36%) were females. No sex predilection has been reported in earlier studies.

LATERALITY

In this study 46(92%) patients had bilateral cataract and 4(8%) patients had unilateral cataract.

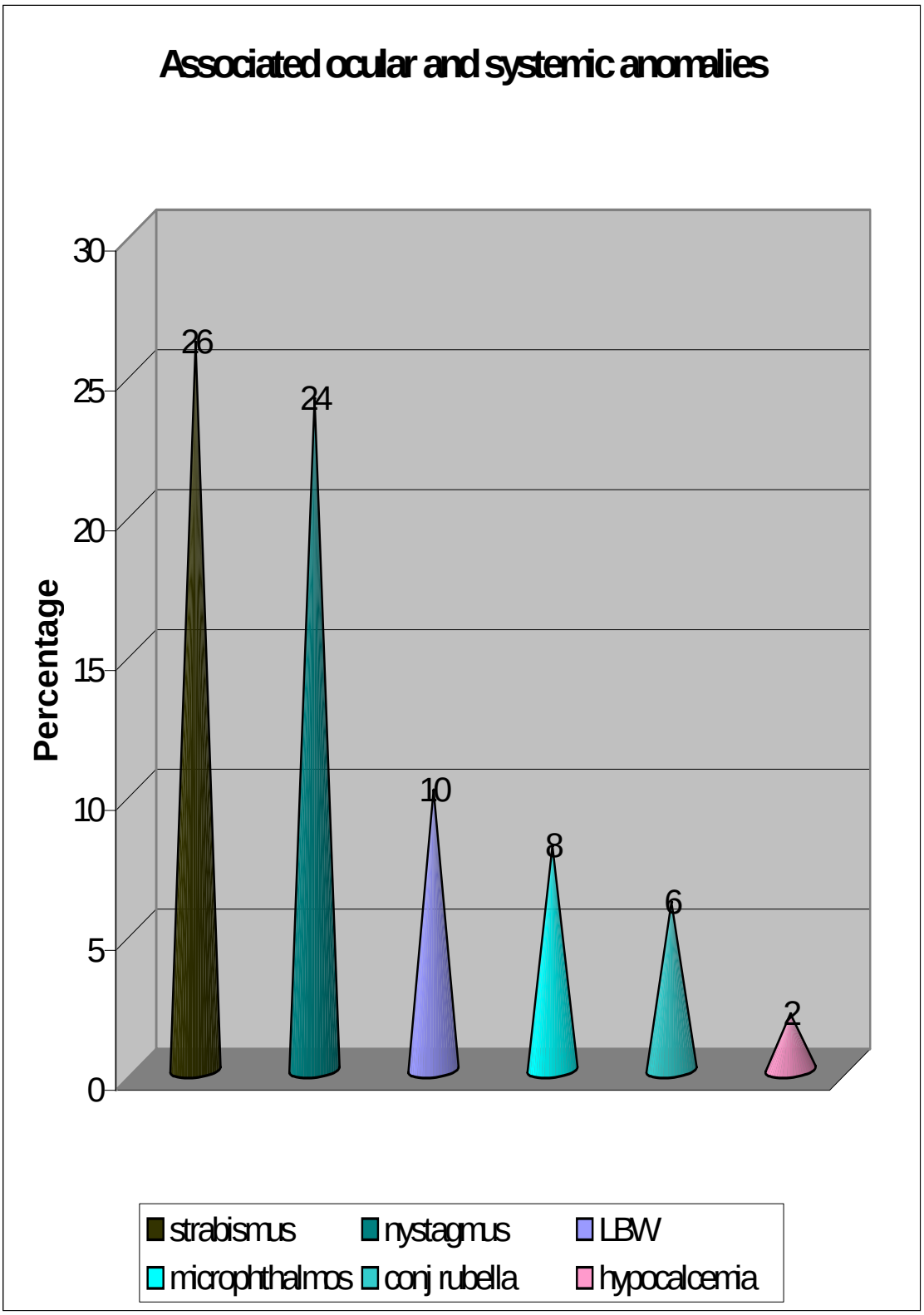
.

A study by Jugnoo S.Rahi, Carol Dezateaux, Measuring and interpreting the incidence of Congenital Ocular Anomalies:Lessons from a National study of Congenital Cataract in the UK IOVS, 2001;42:1444-1448, described the incidence to be 48% females (equal sex distribution) and more incidence of bilateral congenital cataract cases (65%).

MORPHOLOGY

Type	No. of patients	Percentage
Total	26	52
Lamellar	20	40
Sutural	1	2
Blue dot	1	2
Posterior subcapsular	1	2
Floriform	1	2

The commonest type of cataract was found to be total cataract in our study, which was seen in 26 patients (52%). Followed by lamellar cataract in 40% of cases. This could account for the increased incidence of bilaterality in our study.


Associated ocular and systemic anomalies
Percentage
30
25
20
15
10
5
0
26
24
10
8
6
2
strabismus
nystagmus
LBW
microphthalmos
conj rubella
hypocalcemia

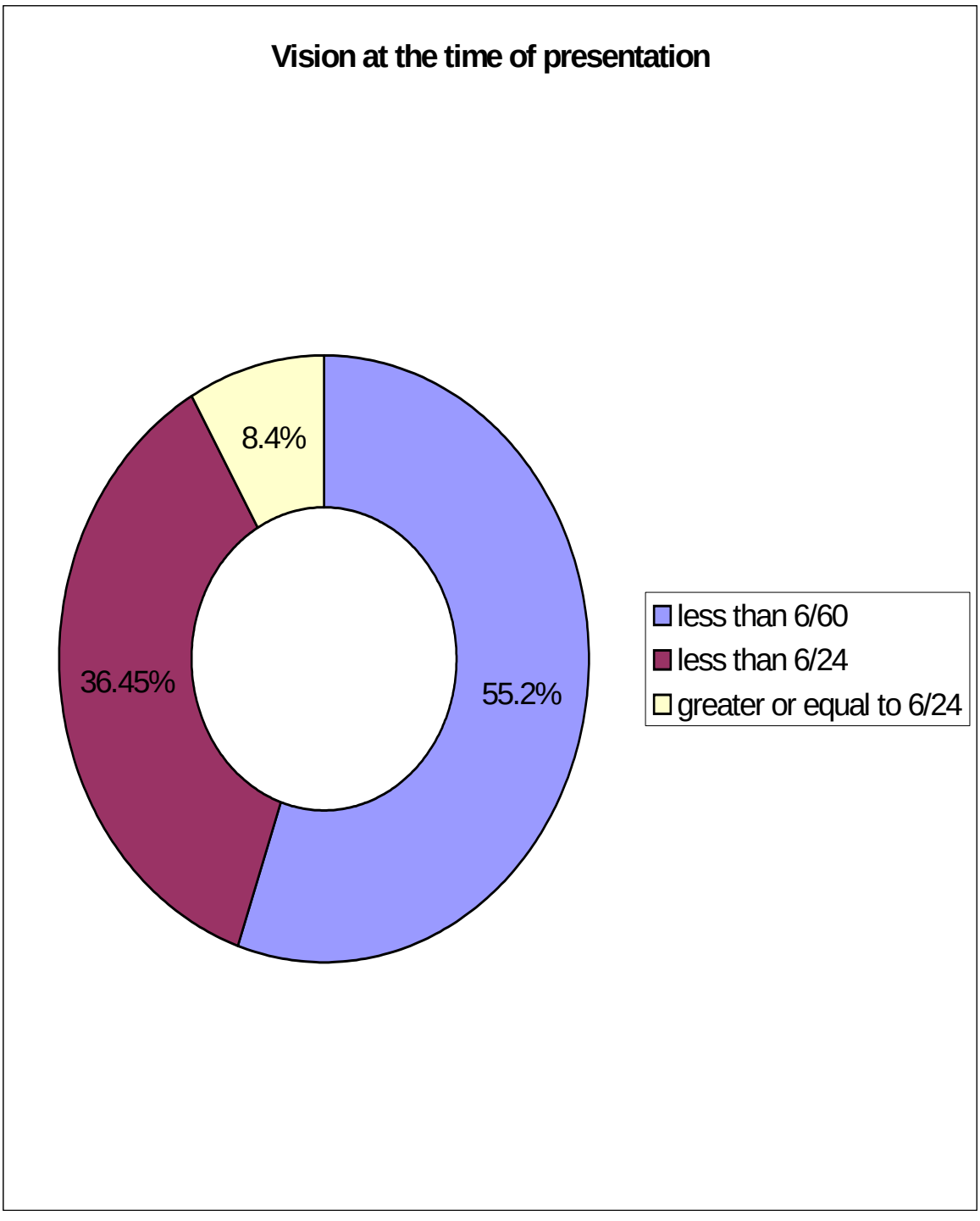
ASSOCIATED OCULAR AND SYSTEMIC ANOMALIES

Condition	Number	Percentage
Strabismus	13	26
Nystagmus	12	24
Cong rubella	3	6
microphthalmos	4	8
IUGR	5	10
Hypocalcemia	1	2

Off the 13 cases of strabismus, 7 had unilateral divergent squint due to visual deprivation. 3 patients had alternate convergent squint and 3 patients had alternate divergent squint.

12(24%) of the children had Nystagmus. IgG rubella was positive in 3(6%) of the children. Microphthalmos was seen in 8%.

One case had hypocalcemia associated with umbilical hernia. In this study 5 out of 50 patients(10%) were Low Birth Weight babies. There is a significant association between Low Birth Weight and the incidence of congenital cataract, in this study. This increased incidence of congenital cataract in low birth weight babies has also been noted by John Paul et al in their study, Infantile Cataract in the collaborative perinatal project, in Archives of Ophthalmology 2002 nov, vol 120 no.11.


Vision at the time of presentation
8.4%
36.45%
55.2%
less than 6/60
less than 6/24
greater or equal to 6/24

VISION AT THE TIME OF PRESENTATION,

Age in yrs	<6/60 (No. of eyes)	Percentage	<6/24 (No. of eyes)	Percentage	≥6/24 (No. of eyes)	Percentage
2-5	20	20.8	16	16.66	0	0
6-9	24	25	13	13.54	4	4.2
10-12	9	9.4	6	6.25	4	4.2

At the time of presentation, out of 96 eyes with cataract, 53 (55.2%) eyes had vision less than 6/60. 35 (36.45%) eyes presented with vision less than 6/24. 8 (8.33%) eyes had vision better or equal to 6/24.

SURGICAL MANAGEMENT OF STUDY CASES

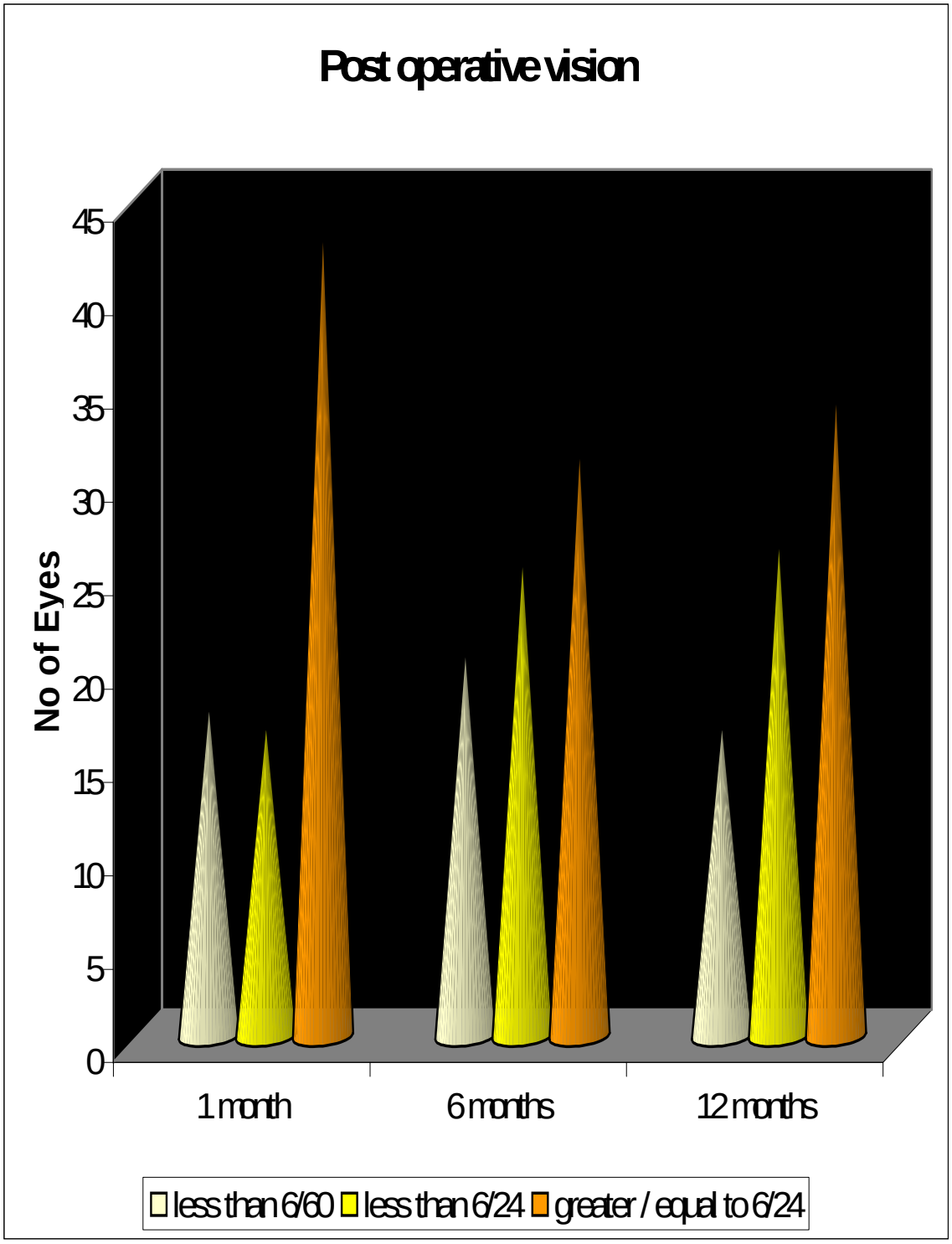
79 (82.29%) eyes out of 96 eyes were operated. 73(92.10%) eyes received primary IOL implantation. We found that implantation of IOL during cataract surgery seems to be a practical option, while other methods of visual Rehabilitation (aphakic glasses and contact lens) are less suitable in the developing countries.

In order to minimize the need to exchange IOLs later in life when a large myopic shift occurs, it has been adviced to under correct children with IOLs, so that they can grow in to emmetropia or mild myopia in adult life.

Wilson, et al in their study, Paediatric cataract blindness in the developing world : Surgical techniques and intraocular lens in the millennium, in BJO 2003: 87:14-19 recommend that an IOL power should be selected for each eye that is likely to give a post op refraction of no more than 4 D of myopia, after full eye growth. This strategy will require leaving a moderate amount of hyperopia in children less than 3 years and mild amount up to age 6 years.

4 eyes out of 96 eyes in our study were unilateral cataract cases. David Taylor, et al in their study, Should we aggressively treat unilateral congenital cataract? In BJO 2001: 85:1120 – 1126 (Sep) advocate early cataract surgery and aggressive optical rehabilitation and occlusion therapy to prevent amblyopia. According to Greenwald MJ, Glaser SR in JAAPOS Jun 1998,2(3): 168-76, PCIOL appears to provide significantly better BSV in unilateral childhood cataract even though there is no substantial increase in visual acuity.

Patients in this study were implanted with PMMA lens. Children less than 6 years had undergone primary posterior capsulotomy with or without anterior vitrectomy, as children above 6 years were found to be mature enough to co operate for YAG capsulotomy if needed.


Post operative vision
No of Eyes
45
40
35
30
25
20
15
10
5
0
1 month
6 months
12 months
less than 6/60
less than 6/24
greater / equal to 6/24

It was similarly reported by Jensen AA,Basthi S, GreenWald MJ, et al in their paper, When may the Posterior Capsule be preserved in Paediatric IOL surgery?, in Ophthalmology 109:324-328,2002, where the authors did a retrospective study of children who under went IOL surgery and concluded that PPC is advisable for children under 6 years and preservation of posterior capsule to be appropriate for older children.

POST –OPERATIVE OUTCOME

VISUAL OUTCOME

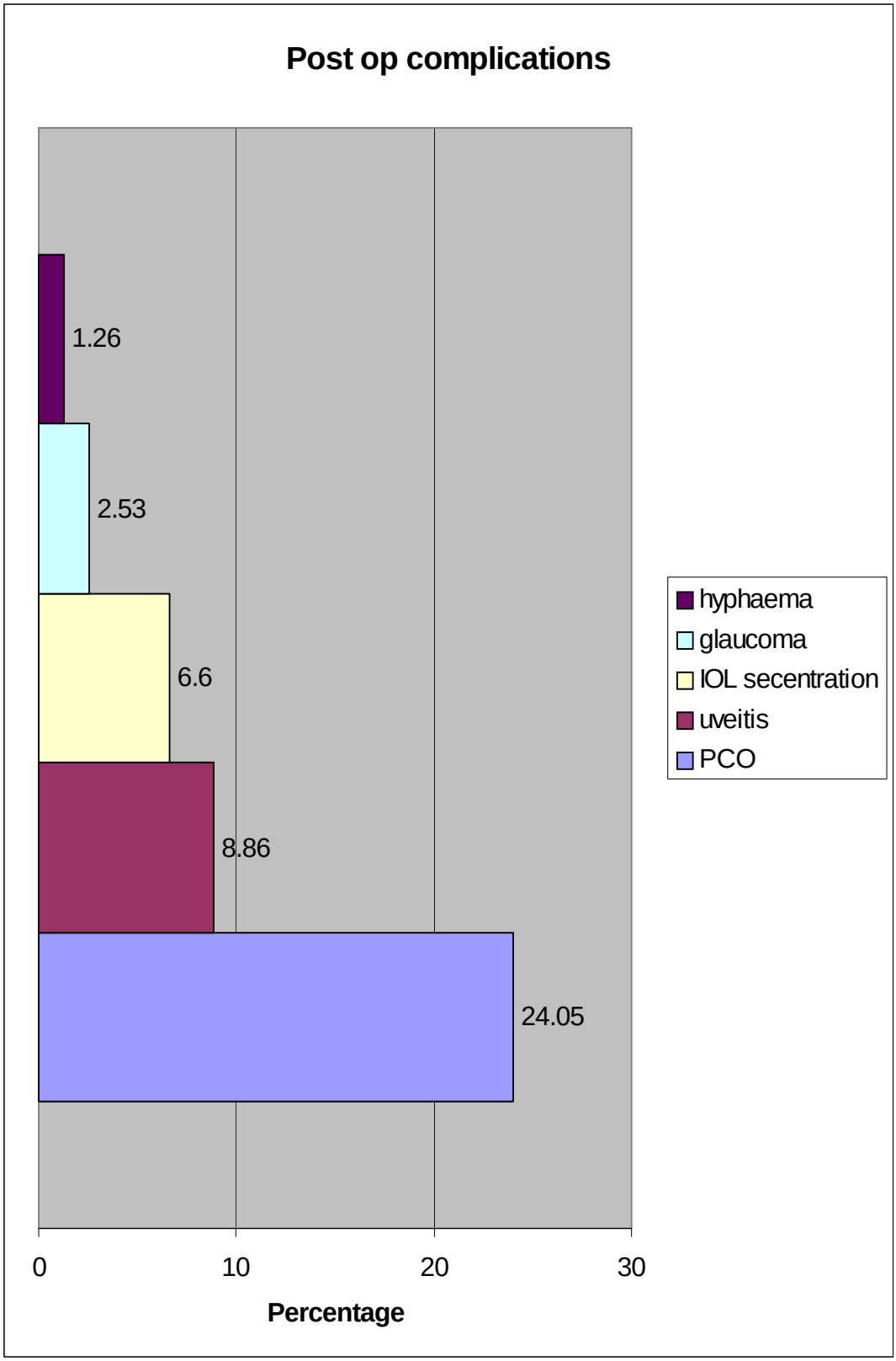
Vision	At 1mon (No. of eyes)	Percentage	At 6 mon (No. of eyes)	percentage	At 12mon (No. of eyes)	percentage
<6/60	18	22.78	21	26.58	17	21.51
<6/24	17	21.51	26	32.91	27	34.14
≥6/24	44	55.69	32	40.50	35	44.30

After one month post operatively, vision greater than 6/24 was seen in 44eyes (55.69%). Vision within this category was seen in 35eyes (44.30%) at the end of 12-months. Vision less than 6/24 was seen in 17 eyes (21.5%) at the end of 1 month, which reduced to 27 eyes (34.14%) at the end of 12 months. Only 18 eyes (22.78%) had vision less than 6/60 in the first postoperative month, which was nearly the same at the end of 12 months.

Good visual outcome could be attained in 76% of patients (6/60 and more) due to adoption of secure incisions, hydrodissection, primary posterior capsulotomy and anterior vitrectomy in our study. Binocular vision in good percentage of cases could be attained if the patient is taken for surgery at and earlier date. This is supported by the study by Lesueur et al in their study named, Visual outcome after paediatric cataract surgery from Purpan University Hospital, Toulouse, France.

The reduction in the mean Snellen acuity in 13% of patients is due to pigment dispersion and development of posterior capsular opacification. This incidence could be further reduced if acrylic lenses with square edged design are used. The study by Wilson et al, in Journal of Cataract and Refractive Surgery 2003 29:1811-1820, have also shown cell deposits and synechiae to be significantly less with acrylic IOLs.

22% of cases had poor visual outcome (less than 6/60). The causes for poor visual outcome were post op uveitis in 9% and IOL decentration due to PCO or membrane formation.


Post op complications
1.26
2.53
6.6
8.86
24.05
hyphaema
glaucoma
IOL secentration
uveitis
PCO
0
10
20
30
Percentage

POST OPERATIVE COMPLICATION

Postop complications	Number	Percentage
Posteriorcapsular opacification	19	24.05
uveitis	7	8.86
IOL decentration	5	6.6
Glaucoma	2	2.53
Hyphema	1	1.26

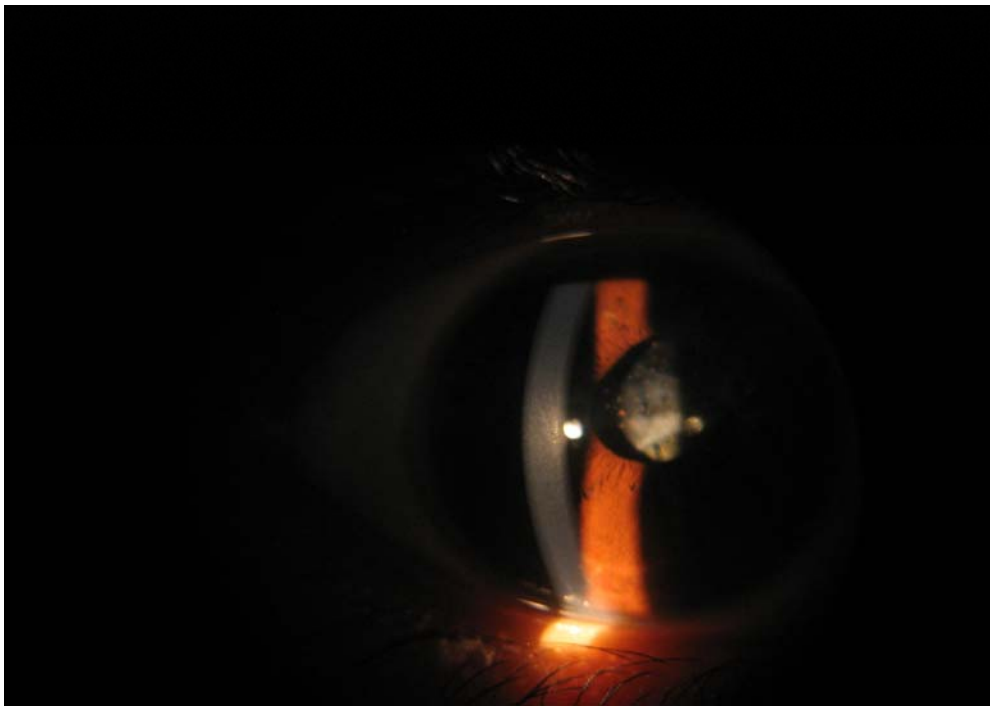
Posterior capsular opacification was seen in 19(24.05%)eyes. The incidence of PCO is relatively less due to adoption of procedures like primary posterior capsulotomy and anterior vitrectomy. This is supported by the retrospective study by DD Koch and T Kohnen in Trans American Ophthalmol Society 1997, 95:351-365, in which the effect of performing cataract surgery with and without posterior capsulotomy and with anterior vitrectomy was compared. It was found that performing posterior capsulotomy with anterior vitrectomy was the only effective method of preventing or delaying the development of PCO.

7(8.86%) eyes had post op uveitis. Atropine was found to reduce the incidence of fibrin reaction in the postop period. Two patients had increased intra ocular tension post operatively. Pupillary capture, IOL decentration was also responsible for decreased vision in 5(6.6%) eyes. PCO was thick enough to require capsulotomy in 16 cases. There was faint red glow and the fundus details could not be made out in these eyes.

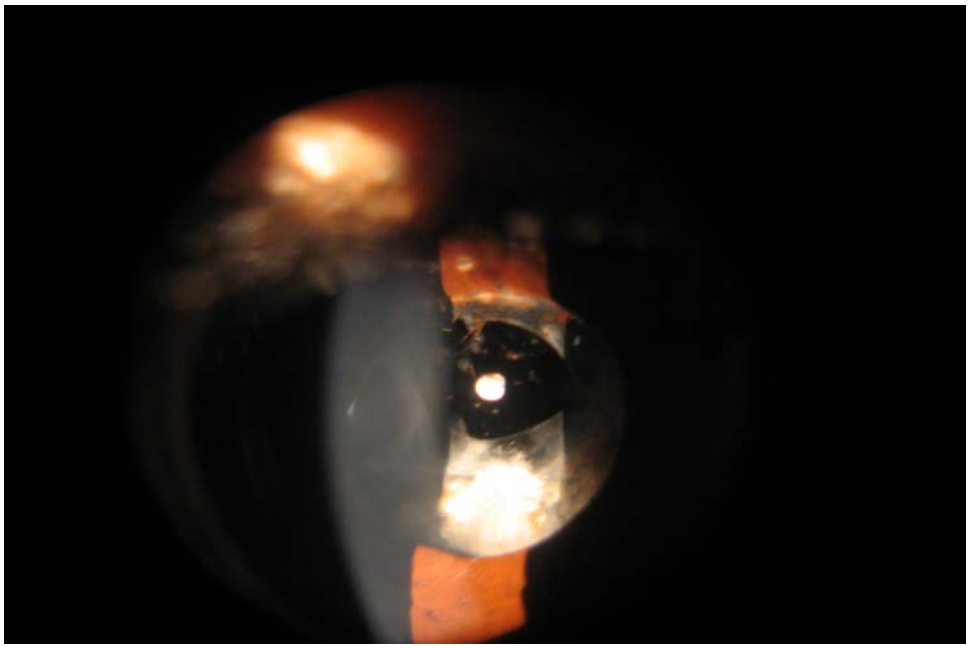
YAG was done in 9 (47.36%) out of 16 eyes. Surgical capsulotomy was needed in 7 eyes (52.63%). Of the 16 eyes 13 eyes (68.42%) improved by two Snellen lines, 3 (26.31%) eyes had the same vision and 1 eye (5.26%) developed uveitis. Though 68.42% of the eyes showed improvement with capsulotomy, this still has to be given some thought, as it requires another episode of General anaesthesia, which has its own complication.

Most of these patients had thick membranes posterior capsular opacification and decentred IOLs. YAG delivery need patient cooperation, which can not be expected in very young children and they also need high energy pulse for effective posterior capsulotomy. 70% of patient had improvement in the visual function after YAG / Surgical capsulotomy. YAG / Surgical capsulotomy play a significant role in visual rehabilitation of paediatric patients.

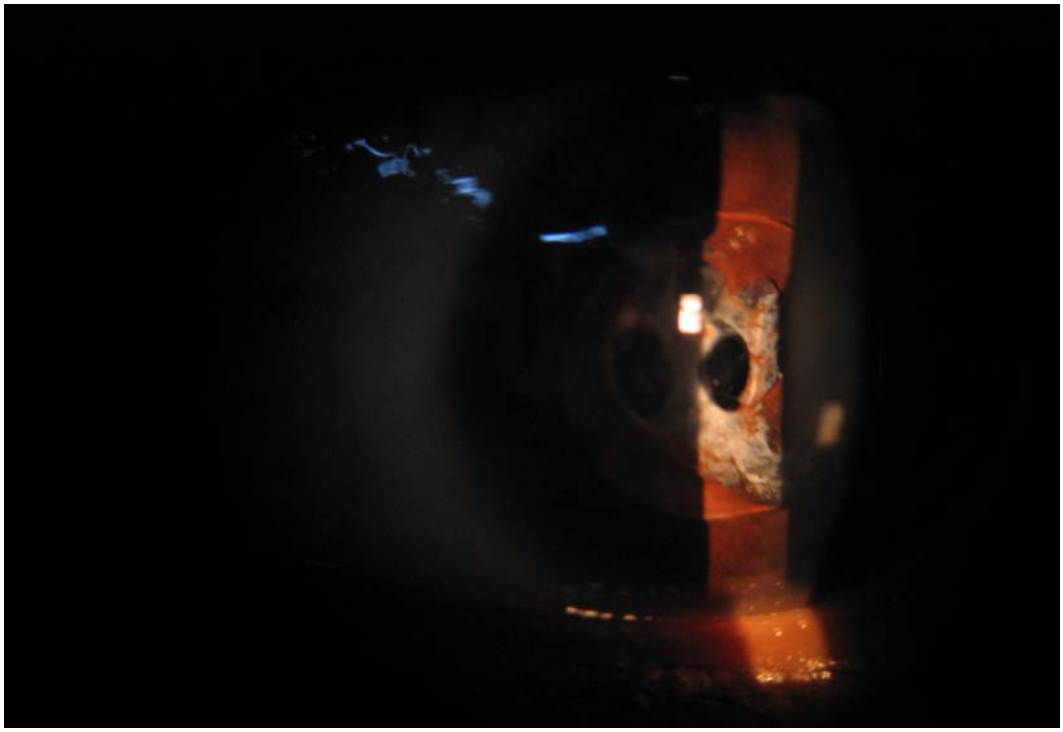
In the paper, to study the pattern of Post op Complications following ECCE with IOL implantation in Paediatric eyes, by Namrata Sharma, Neelam Pushker and Tanuj Dada in Journal of Cataract and Refractive Surgery:vol 25,dec-1999,no.12, 39 eyes were studied. out of these 34(87.2%)eyes came back with PCO. Following N intervention like YAG and surgical capsulotomy and amblyopia therapy 19 eyes(55.88%) achieved 6/18 and better vision.



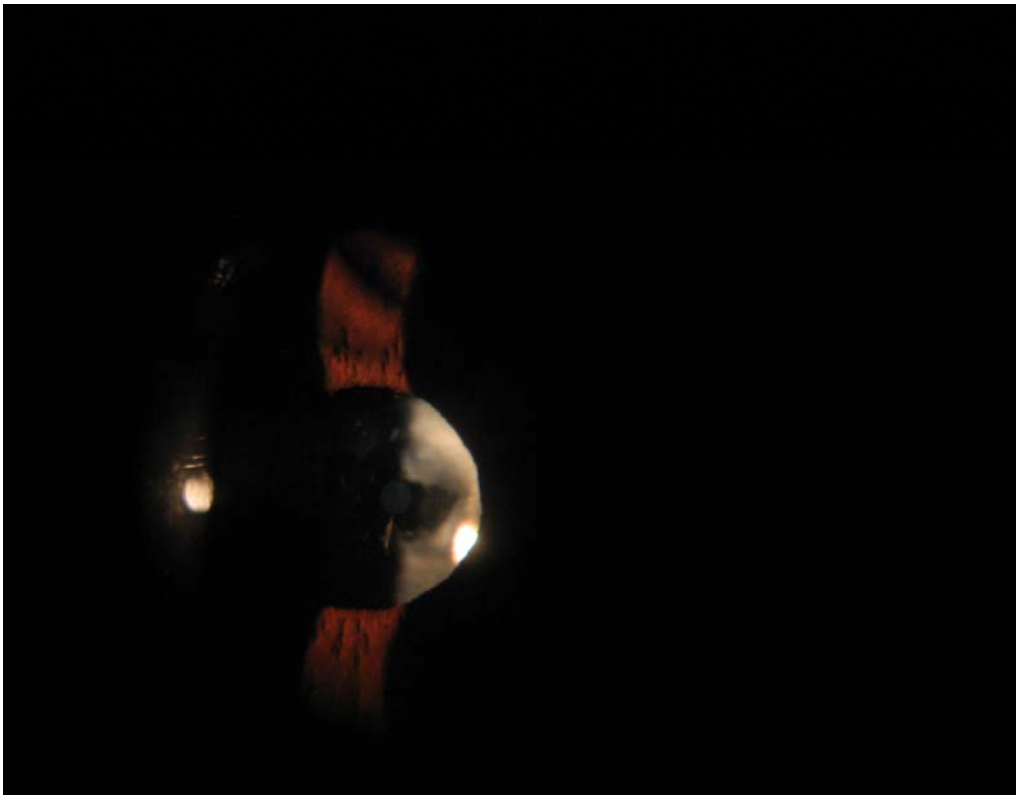
No.14 Hema 12/F PCO



No.14 Hema 12/F Post YAG laser Capsulotomy



No.7 Preethi 8/F Post YAG capsulotomy



No. 49 Maheswaran 8/M Post YAG Capsulotomy

SUMMARY

- Majority of the patients were between 2-5 years, followed by 6-9 years.
- There were more males than females.
- Most of them were bilateral 46 (92%).
- Strabismus was found to be the most common associated ocular anomaly.
- Vision at the time of presentation was less than 6/60 in 53 eyes (55.2%).
- Commonest type of cataract was total cataract followed by lamellar cataract.
- 79 eyes were operated, and IOL was implanted 73 eyes (92%) of the eyes.
- Posterior capsulotomy with or without anterior vitrectomy was done in children less than 6 years of age.
- Following retinoscopic refraction, children were prescribed bifocal spectacles.
- Aphakic spectacles and contact lenses were prescribed in needed cases.
- Visual outcome at the end of 1 month was found to be greater than 6/24 in 55.69%.

- At the end of 12 months, vision greater than 6/24 was 44.3%. PCO was thick enough to require capsulotomy in 16 eyes .
- 9 Children cooperated for YAG capsulotomy.
- 7 eyes needed surgical capsulotomy.
- Complications other than PCO that was noted in this study were uveitis which was seen in 7 eyes and pupillary capture, IOL decentration was seen in 5 eyes, glaucoma in 2 eyes.
- Post capsulotomy, vision increased by two Snellen lines in 13 eyes vision. Vision remained the same in 3 eyes and one child had post YAG uveitis.

CONCLUSION

Childhood cataract is an important cause of blindness in children and imposes a huge socio economic burden on society.

There was male predominance in this study. Total cataract and lamellar cataract were the common type of cataract, which led to significant reduction in visual function.

Most of the children brought, were less than or equal to 6 years of age, even if their cataract wasn’t visually significant, showing the awareness amongst the parents, teachers and the paediatricians.

Strabismus due to visual deprivation in this study stresses the need for early intervention, especially in unilateral cases.

Children less than 6 years who underwent primary posterior capsulotomy with or without anterior vitrectomy showed good visual outcome, supporting the role of primary posterior capsulotomy and anterior vitrectomy.

PCO is the commonest complication and a major cause for visual obscuration following surgery, though the incidence of PCO has been brought down with modified surgical techniques and newer IOL designs.

The incidence of Pupillary capture and IOL decentration was less probably due to the, in the bag fixation of the IOL, made possible by CCC.

Children who needed YAG/surgical capsulotomy had significant visual gain by showing improvement by more than two Snellen lines.

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PROFORMA

NAME :

AGE :

SEX :

OP/IP NO :

ADDRESS :

AGE OF ONSET OF CATARACT

HISTORY

CONSANGUINITY

H/O OF INF/DRUG INTAKE DURING PREG

PRE NATAL/PERINATAL/POST NATAL COMPLICATION

DEVELOPMENTAL MILE STONES

TREATMENT HISTORY

GENERAL EXAM

OCULAR EXAM

VISION

EXTRA OCULAR MOVT

TENSION
SLIT LAMP EXAM,

RIGHT EYE		LEFT EYE
	LID	
	CONJUNCTIVA	
	CORNEA	
	ANT CHAMBER	
	IRIS	
	PUPIL	
	LENS	
	ANT VITREOUS	

UNILAT/BILAT CATARACT

FUNDUS EXAM

STRABISMUS /NYSTAGMUS

OTHER ASS SYSTEMIC ANOMALIES

INVESTIGATIONS,

Hb%

TORCH

A-SCAN

B-SCAN

SURGERY

ONE EYE /BOTH EYES

VISUAL REHABILITATION

WITH IOL/WITHOUT IOL

POST OP COMPLICATIONS

UVEITIS/PCO/GLAUCOMA/RD

MANAGEMENT OF PCO,

YAG/SURGICAL CAPSULOTOMY

POST OP VISION

AT 1 MONTH

AT 6 MONTHS

AT 12 MONTHS

POST CAPSULOTOMY VISION

INDEX TO MASTER CHART

Cons	:	Consanguinity
NC	:	Non – Consanguinous
C	:	Consanguinous
Unilat, U/L	:	Unilateral
Bilat, B/L	:	Bilateral
M	:	Male
F	:	Female
2˚	:	Second degree
3˚	:	Third degree
Microphth	:	Microphthalmos
LBW	:	Low Birth Weight
N	:	Nystagmus
S	:	Strabismus
ADS	:	Alternate Divergent Squint
RDS	:	Right Divergent Squint
ACS	:	Alternate Convergent Squint
BE	:	Both Eyes
RE	:	Right Eye
LE	:	Left Eye
Vn	:	Vision
PCO	:	Post Capsular Opacification
G	:	Glaucoma

PC	:	Pupillary Capture
HC	:	Hypocalcemia
HM	:	Hand Movements
CFCF	:	Counting Fingers Close to Face

s

ABBREVIATION

PCO	:	Posterior Capsular Opacification
IOL	:	Intra Ocular Lens
ECCE	:	Extra Capsular Cataract Extraction
ICG	:	Indo Cyanine Green
HSM	:	Heparin Surface Modified
OVD	:	Ophthalmic Viscoelastic Device
CCC	:	Continuous Curvilinear Capsulorrhexis
LBW	:	Low Birth Weight
BSV	:	Binocular Single Vision

LIST OF SURGRIES PERFORMED

Sl.No.	Name	Age/Sex	OP/IP No.	Date	Eye	Diagnosis	Surgeries
1.	Lakshmi	45/F	51342	10.09.03	RE	Pterygium	Excision
2.	Subramani	29/M	52466	01.10.03	LE	Chalazion	Incision & Curettage
3.	Krishnan	70/M	360818	17.10.03	LE	Cataract	ECCE with PI
4.	Kamakshi	57/F	360934	07.04.04	LE	Cataract	ECCE with PCIOL
5.	Kumarasamy	49/M	361345	15.06.04	RE	Dacryocystitis	Sac Excision
6.	Shanmugam	60/M	366135	09.09.04	LE	Panophthalmitis	Evisceration
7.	Sudhakaran	33/M	375234	06.12.04	LE	Corneal Tear	Suturing Done
8.	Karthikayan	26/M	376600	17.01.05	RE	Penetrating Injury	Corneo-Scleral tear sutured
9.	Kamala	60/F	384455	08.03.05	RE	Immature Cataract	SICS with PCIOL
10.	Rebecca	35/F	380012	14.05.05	LE	Dacryocystitis	Dacryocystorhinostomy
11.	Parasuraman	61/M	386889	28.05.05	RE	Non-Healing Corneal Ulcer	Therapeutic Keratoplasty

Sl.No.	Name	Age/Sex	OP/IP No.	Date	Eye	Diagnosis	Surgeries
12.	Govindan	35/M	51433	04.07.05	RE	Chalazion	Incision and curettage
13.	Therasa	52/F	39404	05.09.05	RE	Corneal Ulcer	Conjunctival Hooding
14.	Madasamy	45/M	379113	07.11.05	LE	Dacryocystitis	Dacryocystorhinostomy
15.	Raniammal	45/M	371068	12.10.05	LE	Pterygium with Cataract	Pterygium excision with SICS and PCIOL
16.	Chellammal	53/F	378013	26.12.05	RE	VII N palsy with Exposure keratitis	Lateral Tarsoraphy
17.	Ravi	26/M	335274	6.01.06	LE	Divergent Squint	LR recessim 8mm MR resection 5.5mm
18.	Nagammal	50/F	341001	13.01.06	RE	POAG with Immature cataract	Trabeculectomy with ECCE and PCIOL
19.	Lakshmanan	65/M	364331	08.02.06	RE	Traumatic Cataract	ECCE with PCIOL
20.	Thandayuthapani	53/M	395232	15.03.06	LE	POAG	Trabeculectomy

MASTER CHART

Sl.No.	Name	Age	Sex	IP No.	Unilat/Bilat	Cons	Associated Anomalies	Pre-op Vn	Morphology	Operated Eye	IOL/Aphakia	Post-op complications	Post-op vision		
													1 mon	6 mon	12 mon
1	dharani	2	F	389140	B/L	NC	LBW, N, HC	1/60BE	total	BE	IOL		6/60BE	6/60BE	6/60BE
2	nandhini	8	F	389102	B/L	C,2		2/60BE	total	RE	IOL	PCO	6/60RE	4/60RE	6/36RE
3	assan	8	M	396979	B/L	NC		6/60BE	total	BE	IOL	PCO	6/36BE	6/36,6/36	6/60BE
4	narmadha	3	F	396790	B/L	C,2		6/60BE	total	BE	IOL	PCO	6/24BE	6/36,6/18	6/60,6/12
5	fyas ahmed	8	M	392866	B/L	NC		1/60,2/60	total	RE	IOL		6/24	6/60	6/60
6	malavika	6	F	396045	B/L	NC	N, ADS	3/60,4/60	total	BE	IOL		6/18,6/12	6/24,6/12	6/18BE
7	preeti	8	F	69580	B/L	NC	LDS	6/24,1/60	lamellar	LE	IOL	PCO,PC	6/24	6/60	6/60
8	mythili	8	F	397177	B/L	NC	N, RDS	HM,6/36	total	BE	IOL		6/24,6/18	6/18,BE	6/18BE
9	selvaraj	12	M	52976	B/L	NC		6/24BE	blue dot	BE	IOL		6/12,6/9	6/18,6/12	6/12BE
10	suresh	6	M	96086	B/L	C,2		1/60,6/24	lamellar	RE	IOL		6/18RE	6/24RE	6/24RE
11	velmurugan	8	m	396958	B/L	NC		6/60BE	total	RE	IOL		6/18	6/24	6/24
12	nithya	2	F	396191	B/L	C,2	N, ACS	2/60BE	lamellar	BE	IOL		4/60	5/60BE	5/60BE
13	marudhupandi	12	M	392542	U/L	NC	RDS	1/60,6/9	total	RE	IOL	PCO,PC	5/60	5/60	6/60
14	hema	12	F	392994	B/L	NC		CFCF,6/24	lamellar	RE	IOL	PCO	6/36	6/36	5/60
15	madan	6	M	396049	B/L	C,3	LBW	5/60,6/18	lamellar	BE	IOL		BE6/12	6/12,6/9	6/9BE
16	ibrahim	9	M	387851	U/L	NC	RDS	6/60,6/6	total	RE	IOL	PC	6/24	6/60	6/60
17	pavithra	10	F	315522	B/L	NC		4/60,6/60	total	BE	IOL		6/12BE	6/24,BE	5/60,6/24
18	poovarassan	10	M	397642	B/L	NC		6/36BE	floriform	LE	IOL		6/12	6/24	6/60
19	basheer ahmed	3	M	392133	B/L	NC		5/60,4/60	total	BE	IOL		6/36BE	624,6/18	6/12BE
20	arun kumar	5	M	397533	B/L	C,2	Microophth,N	5/60BE	total	BE	aphakia		6/18,6/24	6/60,6/36	6/24,6/18
21	guna sundari	12	F	391248	B/L	NC	RDS	HM,3/60	total	BE	IOL	uveitis,G	5/60,6/18	5/60,6/24	6/60,6/18
22	sukumar	7	M	391890	B/L	NC	Microophth	6/60BE	total	BE	aphakia		6/12BE	6/24,6/36	6/24BE
23	damodaran	9	M	391869	B/L	NC	N	5/60BE	lamellar	RE	IOL	PCO	6/9	6/18	6/36
24	ragavendra	9	M	391268	B/L	C,3		6/36,4/60	lamellar	BE	IOL		6/18BE	6/36,6/24	6/36BE
25	yogaraj	11	M	396047	B/L	NC		5/60BE	total	BE	IOL		6/12BE	6/12BE	6/12BE
26	sheeba	12	F	396069	B/L	NC	RDS	3/60,6/36	lamellar	RE	IOL	uveitis,G	6/60	4/60	4/60
27	prasanth	7	M	389011	B/L	C,2	N, ACS	6/36BE	lamellar	BE	IOL	PCO	5/60BE	4/60,5/60	4/60BE
28	manju	7	F	389955	B/L	NC		6/36BE	lamellar	BE	IOL	PCO	6/24BE	6/24,6/18	6/36BE
32	sathya	6	F	395522	B/L	NC	LBW	4/60,CFCF	total	BE	IOL	uveitis	6/36,5/60	5/60,6/36	5/60,6/60

Sl.No.	Name	Age	Sex	IP No.	Unilat/Bilat	Cons	Associated Anomalies	Pre-op Vn	Morphology	Operated Eye	IOL/Aphakia	Post-op complications	Post-op vision		
33	deepak krishna	2	M	395783	B/L	NC	N	2/60BE	total	BE	IOL		5/60BE	6/60BE	6/60BE
34	kanishgar	4	M	397197	B/L	C,3		5/60BE	lamellar	RE	IOL	PCO	3/60	6/60	6/60
35	logesh	2	M	386425	B/L	NC		6/60BE	lamellar	RE	IOL		6/60RE	6/36RE	6/24RE
36	vijayalakshmi	5	F	380945	B/L	NC	N	6/60BE	total	BE	IOL	uveitis	6/18,4/60	6/18,6/36	6/9,6/12
37	sunil kumar	4	M	379331	B/L	NC	LBW	5/60,6/60	total	BE	IOL	uveitis,PCO	2/60,6/24	2/60,6/60	2/60,6/60
38	haridass	5	M	379526	B/L	NC	N,ACS	4/60,6/36	lamellar	RE	IOL	PC	5/60	6/60	6/24
39	hemadri	6	M	380023	B/L	C,2		HM BE	total	BE	IOL		6/36BE	6/60BE	6/24,6/18
40	dilli babu	12	M	354773	B/L	NC		6/60BE	total	BE	IOL	PCO	4/60,6/18	3/60,6/24	3/60,6/18
41	keerthivasan	2	M	379394	B/L	NC	N	1/2/60,2/60	lamellar	LE	IOL		5/60LE	6/36LE	6/36LE
42	bahar	3	M	379782	B/L	NC		6/36BE	total	BE	IOL		6/36,6/24	4/60,5/60	6/24BE
43	prathiba	10	F	379212	B/L	C,2		5/60,6/24	lamellar	RE	IOL		6/12	6/18	6/18
44	yetiappan	2	M	379228	B/L	NC	Microophth	6/60,3/60	total	BE	aphakia	PCO	6/60,4/60	5/60,4/60	5/60BE
45	logini	3	F	380161	U/L	NC		6/9,6/18	sutural	BE	IOL		6/24BE	6/18BE	6/18BE
46	pratyush parveen	6	F	379985	B/L	NC		5/60BE	lamellar	RE	IOL		6/12	6/12	6/9
47	jailani	3	M	388079	B/L	NC	Microophth	4/60.6/60	lamellar	BE	aphakia		6/36,6/24	5/60,6/60	5/60BE
48	sridhar	9	M	389489	B/L	C,2		6/24,HM	PSC	LE	IOL		6/12	6/12	6/9
49	maheswaran	8	M	398554	B/L	C,3	RDS	1/60,2/60	lamellar	RE	IOL	PCO	5/60,	6/60	5/60
50	syed basheer	3	M	398835	B/L	NC	LBW	6/36,5/60	total	BE	IOL	uveitis,PCO	5/60,6/18	4/60,6/18	4/60,6/24